DOCUMENT RESUME

ED 207 826 SE 035 621

AUTHOR Nash, Philip C.; And Others
TITLE A Guide to Energy-Related Curriculum at California Community Colleges and Certain Other Programs.
INSTITUTION Monterey Peninsula Coll., Calif.
SPONS AGENCY Department of Education, Washington, D.C.
PUB DATE Sep 80
NOTE 111p.
AVAILABLE FROM Bob Schaefer, Monterey Peninsula College, Alternative Energy Project, 980 Fremont Blvd., Monterey, CA 93940 (free while supply lasts).

EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS College Curriculum; *College Programs; *Community Colleges; Community Education; Community Services; *Course Descriptions; Degree Requirements; *Energy; Higher Education; Noncredit Courses; Postsecondary Education; *Program Descriptions; Science Curriculum; Science Education
IDENTIFIERS Alternative Energy Sources; *Energy Education

ABSTRACT

Information is provided in five separate sections on California community college energy programs for students interested in selecting a program and for college personnel interested in beginning or improving a program. Contents of most sections are arranged alphabetically according to the name of the college, project, or organization. Section I outlines degree and certificate programs, including requirements and course/program descriptions. Section II identifies individual course offerings, and Section III lists non-credit workshops, forums, and seminars available through community education and community services. Section IV contains information about programs and resources that for the most part are not linked to instructional programs at community colleges in California but may be of interest to community college personnel. The last section identifies information sources for technical and other assistance. (Author/DC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED207826

A Guide to Energy - Related Curriculum at

California Community Colleges and Certain Other Programs

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Philip C. Nash

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

SEPTEMBER 1980

COMPILED BY STAFF AT MONTEREY PENINSULA COLLEGE
AND FUNDED BY VEA, SUBPART III AS ADMINISTERED BY
THE CHANCELLOR'S OFFICE, CALIFORNIA COMMUNITY COLLEGES

SE 035 621

The activity which is the subject of this report was supported in whole or in part by the Department of Education (P.L. 94-486). However, the opinions expressed herein do not necessarily reflect the position or policy of the Department of Education, and no official endorsement by the Department of Education should be inferred.

Edited By: **Philip C. Nash and Robert H. Schaefer**

Compiled by: **Randall Calvert** and **Robert H. Schaefer**

Typing and Clerical by: **Claudia Hutchinson** and **Nel Lowney**

Graphics by: **Brad Smith** and **Mary Burr**

Project Director: **Philip C. Nash**

Dear Reader:

Just a few years ago our community college was challenged by the global problem of energy alternatives and what we could do for our community and nation to educate people to appropriate technologies which may relieve the tremendous pressure we all feel in this continuing frustration.

The report you have before you is the fruition of a full-year's work which we have endeavored on behalf of all the California Community Colleges--work which was continually guided by our desire to provide an instrument which would make it easier for you to make your mark for your community, if you are just starting up an energy program, or seeking to improve on what you already have.

Our project has sent to each Dean of Instruction in the California Community College system a copy of the Solar Installer's Training Program by Werner Schmidt of the Governor's Office of Appropriate Technology. Additionally, we have purchased for each college a full year's subscription to the Alternative Energy News beginning October, 1980.

You will find the enclosed information most helpful in examining what's going on at each California Community College in energy programs, whether it be certificate programs, associate degree programs, CETA funded programs, or Community Education/Services programs. There's abundant help for you, and generally just a few miles away.

We have included the names, addresses, and telephone numbers of your colleagues and, indeed, pertinent agencies who can provide you with answers to problems which you may have in fostering energy programs.

We trust that this will be a helpful manual for you to use time, and again; and we should like to indicate here the tremendous assistance we have had from the Chancellor's Office and State Department of Education who jointly funded this project through Subpart 3 of the Vocational Education Act.

Sincerely,

Philip C. Nash

Philip C. Nash
Monterey, California
September 30, 1980

CONTENTS

SECTION I . . . . . .Degree and Certificate Programs 1-40

SECTION II . . . . . .Course Offerings. 41-55

SECTION III . . . . . .Community Education/Services Workshops, Seminars, or Forums on Energy (non-credit) 56-62

SECTION IV . . . . . .Other Programs of Note 63-94

SECTION V . . . . . .Information Sources 95-97

SECTIONS I - III

Contains information about energy courses/programs at California community colleges organized alphabetically by college name. The chart on the following page can be used as a quick reference in locating the specific item of interest to you: columns 1 and 2 list colleges that have Associate Degree and Certificate Programs and descriptions of these programs will be found in Section I of the Guide; column 3 indicates colleges offering energy-related courses and specific information regarding these courses can be found in Section II; column 4 indicates those colleges offering non-credit workshops, forums, or seminars through Community Education or Community Services, and descriptions of these offerings are provided in Section III of the Guide; column 5 indicates colleges that have CETA funded training programs in Solar/Energy Technology, and information about these programs appears in Section I of the Guide.

SECTION IV

Contains information about programs and resources that for the most part are not linked to instructional programs at community colleges in California, yet might be of interest to community college personnel. These include: training programs offered by Community Based Organizations (CBOs); descriptions of noteworthy programs at community colleges in other states; programs funded by the California Energy Extension Service (CEES); and programs that offer curriculum/information regarding Alcohol Fuels Production and Consumer Homemaking Education.

SECTION V

Contains a list of INFORMATION SOURCES to which you might turn for technical and other assistance.

CHART OF ENERGY COURSES/PROGRAMS AT CALIFORNIA COMMUNITY COLLEGES

COLLEGES	Assoc. Degree Prog.	Certificate Prog.	Course Offerings	Comm. Ed. Offerings	CETA Program
ALAMEDA					
ALLAN HANCOCK			X		
AMERICAN RIVER			X		
ANTELOPE VALLEY			X	X	
BAKERSFIELD			X		
BARSTOW			X		
BUTTE			X	X	
CABRILLO	X	X	X	X	
CANADA			X	X	
CANYONS					
CERRITOS			X	X	
CERRO COSO	X	X	X	X	
CHABOT			X		
CHAFFEY	X	X	X		
CITRUS			X	X	
COASTLINE		X	X		
COLUMBIA			X	X	
COMPTON					
CONTRA COSTA		X	X		X
COSUMNES RIVER	X		X		
CRAFTON HILLS					
CUESTA			X		
CUYAMACA			X		
CYPRESS					
DE ANZA			X	X	
DESERT			X		
DIABLO VALLEY			X		
EAST LOS ANGELES					
EL CAMINO			X		
EVERGREEN VALLEY					
FEATHER RIVER			X		
FOOTHILL			X		
FRESNO CITY			X		
FULLERTON					
GAVILAN			X	X	
GLENDALE			X		
GOLDEN WEST			X		
GROSSMONT					
HARTNELL					
IMPERIAL VALLEY		X	X	X	X
INDIAN VALLEY				X	
LAKE TAHOE			X	X	
LANEY					
LASSEN			X	X	
LONG BEACH CITY			X		
LOS ANGELES CITY				X	
LOS ANGELES HARBOR	X			X	
LOS ANGELES MISSION				X	
LOS ANGELES PIERCE				X	
LOS ANGELES SOUTHWEST					
LOS ANGELES TRADE TECH			X		
LOS ANGELES VALLEY			X		
LOS MEDANOS			X		

COLLEGES	Assoc. Degree Prog.	Certificate Prog.	Course Offerings	Comm. Ed. Offerings	CETA Program
MARIN			X	X	
MENDOCINO			X		
MERCED		X	X	X	
MERRITT			X	X	
MIRA COSTA					
MISSION			X	X	
MODESTO			X	X	
MONTEREY PENINSULA		X	X	X	X
MOORPARK					
MT. SAN ANTONIO			X	X	
MT. SAN JACINTO			X		
NAPA					
OHLONE			X		
ORANGE COAST		X	X	X	
OXNARD			X		
PALO VERDE			X		
PALOMAR					
PASADENA CITY			X	X	
PORTERVILLE					
REDWOODS			X	X	
REEDLEY					
RIO HONDO					
RIVERSIDE CITY			X		
SACRAMENTO CITY	X		X		
SADDLEBACK		X	X		X
SAN BERNARDINO VALLEY			X	X	
SAN DIEGO CITY			X		
SAN DIEGO EVENING	X	X	X		
SAN DIEGO MESA			X	X	
SAN DIEGO MIRAMAR					
SAN FRANCISCO CITY					
SAN JOAQUIN DELTA					
SAN JOSE CITY	X	X	X	X	
SAN MATEO					
SANTA ANA	X	X	X		
SANTA BARBARA CITY					
SANTA MONICA					
SANTA ROSA			X		
SEQUOIAS			X		
SHASTA				X	
SIERRA	X	X	X	X	
SISKIYOUS			X	X	
SKYLINE					
SOLANO			X		
SOUTHWESTERN				X	
TAFT				X	
VENTURA			X	X	
VICTOR VALLEY			X	X	
VISTA	X		X		
WEST HILLS				X	
WEST LOS ANGELES				X	
WEST VALLEY			X		
YUBA				X	

SECTION 1
DEGREE AND CERTIFICATE PROGRAMS

CABRILLO COLLEGE
6500 Soquel Drive
Aptos, CA 95003

David Burton, Coordinator
Solar Energy Tech. Program
(408) 425-6000, ext. 6235

SOLAR TECHNOLOGY - CERTIFICATE AND ASSOCIATE DEGREE PROGRAM

The purpose of the Solar Energy Technology program is to prepare students for careers in the emerging field of solar energy as designers, builders, installers and marketers.

CURRICULUM

Requirements for Certificate:

Fundamentals of Solar Energy	SET 50	3
Solar Tech & Fabrication I	SET 51	4
Solar Tech & Fabrication II	SET 52	4
Solar Architecture	SET 54	3
Solar Remodeling I	SET 55	2
Solar Energy in Agriculture	SET 57	4
Solar Electronics	SET 59	2
Special Studies or	SET 10S	
S. E. Community Education	SET 61	2
		24
Additional courses in SET		6
		30

Requirements for Associate Degree:

Certificate Requirements	30
General Education Requirements:	
English Composition	3
Learning Skills	3
U.S. History or Political Science	3
Social Science Elective	3
Natural Science Elective	3
Humanities Elective	3
Health Science Elective	2-3
	20

CORE ENERGY CLASSES

SET 50 Fundamentals of Solar Energy 3 units

Fundamentals of solar energy collection, conversion and use, energy flow and energy conservation, solar radiation, heat transfer and storage methods. Survey of renewable energy systems using solar, wind, water and biofuels. Class hours: 3 hours lecture.

CABRILLO COLLEGE cont'd.

SET 51 Solar Technology & Fabrication I 4 units

A general introduction to active solar systems including the collection, circulation, storage, and sizing of low-mid-high temperature devices. Emphasis will be on practical applications to residential hot water, swimming pool and space heating systems. Laboratory includes selection of materials, design and fabrication of solar energy equipment. Class hours: 3 hours lecture, 3 hours laboratory.

SET 52 Solar Technology & Fabrication II 4 units

Continued studies in the technical aspects of the design and fabrication of active solar systems. Emphasis will be on appropriate design, materials selection, and fabrication of actual working systems geared to the specific needs of Santa Cruz County's varied microclimates. Class hours: 3 hours lecture, 3 hours laboratory.

SET 53 Solar Home Design 3 units

Survey of solar energy applications to home design and construction. Energy conservation, direct gain, passive, active and hybrid systems for solar heating and natural cooling will be introduced. Class hours: 3 hours lecture.

SET 54 Solar Architecture 3 units

A course focusing on the use of architecture to modify the effects of climate on building interiors. Emphasis will be on the design, construction and testing of small scale passive and hybrid structures to determine solar heating and natural cooling effects. Class hours: 2 hours lecture, 3 hours laboratory.

SET 55 Solar Remodeling I 2 units

Designed for the renter and home owner. The course deals with the principles and practices of solar tempering and weatherizing existing residential structures. Attention will be given to low cost mobile solar devices, their design and construction. Class hours: 1 hour lecture, 3 hours laboratory.

SET 56 Solar Remodeling II 2 units

Continuing studies in solar retrofit techniques for existing dwellings. The course will include thermal analysis and redesign of structural components to produce economically feasible modification. Attention will be given to both active and passive solutions to solar remodeling problems. Class hours: 1 hour lecture, 3 hours laboratory.

SET 57 — Solar Energy in Agriculture — 4 units

A survey of solar energy systems in agriculture including solar design theory, solar heated greenhouses, bioconversion systems (methane, alcohol, pyrolysis, biomass farms, etc.), solar crop dryers, solar irrigation systems and solar space heating of agricultural structures. Class hours: 2 hours lecture, 2 hours discussion.

SET 58 — Applications of Solar Energy in Agriculture — 2 units

This course is an extension of SET 57 for the advanced student. Attention will be given to the design, maintenance and monitoring of solar heated greenhouses, solar crop dryers, and other solar tempered agricultural facilities. Class hours: 1 hour lecture, 3 hours laboratory.

SET 59 — Solar Electronics — 2 units

This course applies basic electronic principles to solar energy systems. Topics include generation of electric power with solar cells, installation and operation of solar controls, and the use of electronic instruments for testing and monitoring solar systems. Emphasis will be on experimental projects. Class hours: 1 hour lecture, 3 hours laboratory.

SET 60 — Wind Energy — 2 units

A course intended to give a technical understanding of wind energy systems. Topics will include wind characteristics, the history of wind turbines, and the appropriate design of wind energy systems. Students will build anemometers, electrical circuits, and small wind turbines. Class hours: 1 hour lecture, 3 hours laboratory.

SET 61 — Solar Energy - Community Studies — 2 units

This course is intended for the advanced solar student who is articulate and knowledgeable in solar principles and applications. Students will present basic information on solar energy, and give demonstrations of solar devices to schools, community groups and fairs in the Santa Cruz area. Class hours: 6 hours arranged.

SET 62AB — Solar Field Studies — 2-1 units

This course will explore applications of solar energy as they are found in industrial, commercial, and residential systems. Selected field trips and conferences in the western United States to be attended. Dates and locations to be listed for Summer and Intersession. Class Hours: A: 1 hour lecture, 3 hours laboratory; B: 3 hours laboratory.

CABRILLO COLLEGE cont'd.

SET 10S Special Studies 2-2 units

Class hours: 6 hours arranged.

CERRO COSO COMMUNITY COLLLEGE
Ridgecrest, CA 93555

Richard Dodge
Dean of Instruction
(714) 375-5001

ASSOCIATE OF SCIENCE DEGREE - SOLAR ENERGY TECHNOLOGY
CERTIFICATE PROGRAM - SOLAR ENERGY TECHNOLOGY

CURRICULUM

Introduction to Solar Energy	SET 55	2
Collectors & Energy Storage	SET 56	2
Solar Sizing, Design & Retrofit	SET 57	2
Materials & Materials Handling	SET 58	3
Operational Diagnosis	SET 59	3
Non Residential Application and Future Technology	SET 62	3
Technical Survey of Energy Sources	SET 63	2
Economics, Codes, Legal, Consumerism	SET 64	2
Occ./Career Work Exper. Seminar	SET 60a	1
Occ./Career Work Experience	SET 61a	1-3

CORE ENERGY CLASSES

SET 55 Introduction to Solar Energy 2 units

History of solar energy; an overview of collector types; converting solar radiation to thermal energy; the effects of alternate types of energy efficient construction; traditional and non-traditional solar applications and a general solar vocabulary. Two hours lecture.

SET 56 Collectors & Energy Storage 3 units

Collecting solar energy for home heating and cooling; detailed study of collector types; hands-on experience with common collectors; chemical compatibility of different collector materials and collector fluids; comparison of current systems; exotic collection and storage systems. Two hours lecture, three hours laboratory.

SET 57 Solar Sizing, Design & Retrofit 2 units

Solar system installation for total environmental control; control systems for heating; cooling and domestic hot water. Integration of solar with conventional systems; sizing of systems and system components; heating and cooling load will be studied. Two hours lecture.

CERRO COSO COMMUNITY COLLEGE cont'd.

SET 58 — Materials & Materials Handling — 3 units

The properties and handling of materials which are utilized in construction of a solar system. The basics of plumbing, sheetmetal, carpentry, roofing, glazing, concrete work, soldering, welding and material compatibility. Two hour lecture, three hours laboratory.

SET 59 — Operational Diagnosis — 3 units

Instrumentation and measurements to correctly set up and evaluate a solar system. Examination and identification of common problems likely to be encountered in a malfunctioning solar system. Intentionally introducted system problems will be identified and repaired. Two hours lecture, three hours laboratory.

SET 62 — Non-Residential Applications and Future Technology — 3 units

Application of solar technology for uses other than home heating and cooling. Open-ended course materials will be added or deleted as new technologies are developed, come into use, or are discarded. Two hours lecture, three hours laboratory.

SET 63 — Technical Survey of Energy Sources — 2 units

Supply capabilities of traditional energy resources and the capabilities of future energy resources, energy conservation and environmental problems. Two hours lecture.

SET 64 — Economics, Codes, Legal and Consumerism — 2 units

Economics of solar energy systems and how they are affected by governmental action. Methods of calculating economic costs and benefits related to both active and passive solar systems. Solar system financing, customer relations, guarantees and consumer protection. Two hours lecture.

CHAFFEY COLLEGE
5885 Haven Avenue
Alta Loma, California 91701

William D. Hunt
Solar Program Coordinator
(714) 987-1737, ext. 412

ASSOCIATE IN SCIENCE DEGREE - SOLAR TECHNOLOGY
SOLAR TECHNOLOGY INSTALLATION CERTIFICATE

The Solar Technology program has been developed to provide solar vocational/technical training in a new and dynamic career field. The two year degree program will provide the knowledge conpetencies and skills required of solar technicians by the solar industry at large.

The certificate program is designed to meet two needs: To train solar installer mechanics to work in the solar industry; and secondly, with the exception of C.E. 183, to assist the layman in installing his own home solar system.

CURRICULUM

Associate in Science Degree:

Introduction to Solar Technology	S.T. 500	4
Solar Hydronic Systems	S.T. 502	3
Solar Air Systems	S.T. 504	3
Solar Heat Transfer	S.T. 520	4
Solar Sizing	S.T. 522	4
Blueprint Reading	S.T. 524	2
Solar Energy Seminar	S.T. 526	2
Mechanical Drafting I	Draft 120	3
Blueprint Reading: Building	Draft 510	1
Intro. to Industrial Electricity	Elecy 510	5
Intro. to Electronics	Elect 501 (RS)	6
Career Field Studies Work Exp.	C.E. 183	3

Suggested:

Fundamentals of Physics	Physics 110	4
Business Law I	Bus. 118	4
Public Speaking	C.A. 102	4

Solar Technology Installation Certificate:

Intro. to Solar Technology	S.T. 500	4
Solar Hydronic Systems	S.T. 502	3
Solar Air Systems	S.T. 504	3
Career Field Studies Work Exp.	C.E. 183	3

CORE ENERGY CLASSES

S.T. 50 Orientation to Solar Technology 1 unit

A survey of Solar Technology courses and programs, of skills needed for success, and of the career opportunities within the field. Designed to provide the student with information needed to make appropriate course and career choices.

CHAFFEY COLLEGE cont'd.

S.T. 500 Introduction to Solar Technology 4 units

Emphasis on solar energy utilization, past, present, and future. Survey of all other energy alternatives: wind, hydrogen, biomass, synthetic fuels, methane, tidal, geothermal, fusion and conservation technologies.

S.T. 502 Solar Hydronic Systems 3 units

Introduction to the skills required to install solar plumbing, pumps, controls, heat exchangers, storage vessels, and collectors in solar hydronic systems for pools, domestic hot water, and space conditioning.

S.T. 504 Solar Air Systems 3 units

Introduction to the skills required to install solar ductwork, blowers, controls, heat exchangers, storage vessels, and collectors in solar air systems for space conditioning. Additional emphasis on auxiliary backup systems typically used in both air and hydronic space conditioning.

S.T. 520 Solar Heat Transfer 4 units

Introduction to conduction, convection, and radiation heat transfer in solar collectors, buildings, and heat exchangers. Emphasis on problem solving by using given quantitative formulas and equations.

S.T. 522 Solar Sizing 4 units

Quantitative and qualitative aspects of sizing and designing solar heating and cooling system components for domestic hot water, pools and space conditioning.

S.T. 524 Blueprint Reading and Sketching 2 units

Reading residential and commercial blueprints. The various symbols, techniques, and conventional practices; orthographic projection and the ability to make freehand pencil sketches of job layouts or duct work. Wiring schematics.

S.T. 528 Solar Energy Seminar 1 units

Individual, in-depth research into alternative energy topics of interest to the student of solar technology.

COASTLINE COMMUNITY COLLEGE
10231 Slater Avenue
Fountain Valley, CA 92708

Art Martinez
Associate Dean
(714) 898-9871

CERTIFICATE PROGRAM - ENERGY MANAGEMENT

Energy Management trains technicians who can apply a knowledge of energy systems, energy management principles, energy conservation, and energy planning.

CURRICULUM

Energy Management	Eng. Mgmt. 100	3
Practical Energy Economics	Eng. Mgmt. 101	3
Sys. Anal. for Energy Mgmt.	Eng. Mgmt. 102	3
Energy Mgmt./Human Behavior	Eng. Mgmt. 103	3
Environmental Equipment	Eng. Mgmt. 210	3
Energy Management Planning	Eng. Mgmt. 220	3
Lighting Systems Design	Eng. Mgmt. 230	3
Introduction to Computers	BIS 100 or	
Technical Report Writing	English 105 or	
Introduction to Supervision	Supv. 804	3
Electives		3
TOTAL UNITS		24

CORE ENERGY CLASSES

Energy Mgmt. 100 Principles of Energy Management 3 units

This course is designed for "energy managers" and to give them an overview of primary energy forms, their history, present and future worth, as relates to public, commerce and industry. Energy as it relates to other disciplines, such as architecture, engineering and government agencies. Serves as an aid in determining energy sources, costs and application. Three hours lecture per week.

Energy Mgmt. 101 Practical Energy Economics 3 units

Course includes life cycle costs of basic energy and how it is affected by socio-political actions, regulatory agencies and business plans. Three hours lecture per week

Energy Mgmt. 102 Systems Analysis for Energy Mgmt. 3 units

Course is designed to provide students with the basic skills needed to effectively identify and analyze organizational energy problems. A creative approach to the application of systematic, quantitative methods and techniques in an attempt to obtain preferred solutions. Course includes field application of classroom theory and a review of current energy conservation products, service and procedures. Three hours lecture per week.

COASTLINE COMMUNITY COLLEGE cont'd.

Energy Mgmt. 103 Energy Management & Human Behavior 3 units

Course seeks to apply knowledge and techniques of the social and behavioral sciences to the solution of practical problems encountered by energy management specialists. "Human Factors" explored include: Attitudes toward energy consumption, sources of resistance to energy-conserving measures and techniques for modifying energy-related behavior. Students to design and carry out group field research projects. Three hours lecture per week.

Energy Mgmt. 210 Environmental Equipment 3 units

This course is a practical introduction to air-conditioning systems and their application in commercial, industrial and residential buildings. The primary emphasis of the course will be on conservation from an engineering viewpoint. Three hours lecture per week.

Energy Mgmt. 220 Energy Management Planning 3 units

Course is designed to provide students with the knowledge to identify energy-using equipment, analyze its operation and prepare recommendations for conserving energy and/or improving efficiencies. Emphasis will be placed on developing energy management plans. Three hours lecture per week.

Energy Mgmt. 230 Lighting Systems Design 3 units

This course provides students with the knowledge to design commercial and industrial lighting systems and to recommend conservation and other energy management techniques. Three hours lecture per week.

Contra Costa College
2600 Mission Bell Drive
San Pablo, CA 94806

Ken Jackson
Director, Technical &
Industrial Education
(415) 235-7800

TYPE OF PROGRAM: (Certificate Program) Solar Energy Technology

NUMBER OF STUDENTS: 14

DATES OF OPERATION: June 1979 - June 1980

SOURCE OF FUNDS: CETA

PROGRAM DESCRIPTION: One-year training program which granted a Certificate in Solar Energy Technology to the 14 persons who completed training. Training included one semester each of the following:

Introduction to Construction
Industrial Blueprint Reading
Construction Blueprint Reading
Vocational Arithmetic
Vocational Geometry
Warm Air Heating and Air Conditioning
Hydronics
Refrigeration and Gas Burners
Electricity and Controls
Active Solar Systems
Passive Solar Systems
On-the Job Training

COSUMNES RIVER COLLEGE
8401 Center Parkway
Sacramento, CA 95823

Robert Gari
Harold House
(916) 421-1000

ASSOCIATE OF SCIENCE DEGREE IN ENVIRONMENTAL DESIGN
Solar and Alternative Energy Systems Option

The solar energy applications option introduces students to building design facilitating solar energy utilization. The program provides training and activities in solar energy appliance construction, installation, and maintenance, energy conservation, alternate energy systems, and small business procedures. The program emphasizes entry level job skills.

CURRICULUM

First Year:	
Env. Des. 3, 30	4
Env. Des. 5, 31	4
Env. Des. 6, 18	5
Env. Des. 7	3
Env. Des. 1, 16	5
English 1A, 50 or Sec. Pract. 50	3
Learning Skills	3
Physical Education	2
Electives	1
	30

Second Year:	
Env. Des. 32, 52	3
Env. Des. 35, 71	6
Env. Des. 46	1½
Env. Des. 80	2
Env. Des. 47	1½
Health Education 1	2
Natural Science	3
U.S. History/Govt.	3
Social Science	3
Electives	5
	30

CORE ENERGY CLASSES

ENV. DES. 31 Introduction to Solar Energy Systems 2 units

A design/drafting course to apply solar energy to building construction. Study of building design to facilitate solar energy utilization; space heating and cooling using solar energy; passive solar systems; active solar systems; new solar architectures; retrofitting of existing structures; systems in use in today's solar design; and consideration for new applications.

COSUMNES RIVER COLLEGE cont'd.

ENV. DES. 32 — Solar Heated Water Systems for the House — 2 units

Learning to use solar energy to heat domestic hot water systems and swimming pools. Will explore site analysis of the system, amortization of costs, building code requirements, and purchase of components. Each student will be encouraged to design a system for their own residence.

ENV. DES. 33 — Introduction to Solar Collector Construction — 1 unit

An introductory experience in the design and construction of a flat plate solar collector. Major areas of concern will include tools, materials, constructing and evaluating a solar energy collector.

ENV. DES. 47 — Alternate Energy Systems — 1½ units

Study of the various alternate energy systems. Emphasis on solar design. Comprehensive overview of alternative energy systems, with emphasis on solar design, heat load calculations, system design, economic feasibility of domestic hot water heating, space heating and space cooling utilizing solar energy.

ENV. DES. 71 — Solar Energy Appliances Construction and Installation — 3 units

A hands-on laboratory experience which will involve students in design, construction and installation of solar collector system. Major subject areas will include tools and their uses, appropriate materials, construction techniques, storage systems, switching electrical systems and installation procedures. The skills developed may be used for commercial or private installations.

Imperial Valley College
P.O. Box 158
Imperial, CA 92251

Phil Champagne
Alternate Energy Coordinator
(714) 352-8320

TYPE OF PROGRAM:	(Certificate Program) Alternate Energy Technician Training
DATES OF OPERATION:	Program initiated March 1980
NUMBER OF STUDENTS:	15 - 18
SOURCE OF FUNDS:	CETA

PROGRAM DESCRIPTION: Nine month training program, 40% classroom and 60% hands-on, with 18 additional weeks of OJT. Curriculum covers alcohol production, wind and geothermal energy, in addition to active and passive solar systems. First class completed coursework on August 15, 1980, and presently doing OJT. Second training class begins November 1, 1980.

Note: The Department of Energy's East Mesa Test Facility has been given to the college for the establishment of an engineering training center for geothermal energy (graduate and undergraduate levels) that is scheduled to open July 1, 1981.

The college recently received a State Food and Agriculture grant and will be conducting a series of 3-4 short term courses (6-8 weeks) on Alcohol Fuels Production (how to build solar stills, operate them, etc.).

LOS ANGELES HARBOR COLLEGE
111 Figueroa Place
Wilmington, CA 90744

Ken Fiske, Professor
Technology Division
(213) 518-1000, Ext. 213

ASSOCIATE OF SCIENCE DEGREE-SOLAR ENGINEERING TECHNOLOGIST (SET)

The Solar Engineering Technologist (SET) program is a combination of courses selected from Air Conditioning and Refrigeration, Electronic Engineering Technologist, and Electro-Mechanical Engineering Technologist. These, coupled with appropriate Solar courses, will prepare the student for employment as a solar technician in research laboratories, test facilities, solar companies, and other energy related organizations. The program is scheduled for implementation by Fall 1981.

CURRICULUM

Requirements for Associate of Science Degree		Units
Solar 1	Introduction to Solar Energy	2
Solar 2	Collectors & Energy Storage	3
Solar 3	Solar Sizing, Design, & Retrofit	3
Solar 4	Materials & Materials Handling	2
Solar 5	Operational Diagnosis I	4
Solar 6	Operational Diagnosis II	4
Solar 7	Heat Pump Theory	1
Solar 8	Non-Residential Applications and Future Technology	2
Solar 9	Economics, Codes, Legal, Consumerism	2
Solar 81	Solar Projects Laboratory	2
Eng Tek 25	Industrial Safety	1
Eng Tek 35	Programming for Computer Technicians	2
Eng Tek 49	Technical Mathematics II	3
Eng Tek 50	Technical Mathematics III	3
Air Con 1	Refrigeration Servicing I	4
Air Con 2	Refrigeration Servicing Lab I	2
Draft 16	Blueprint Reading I	2
Draft 17	Blueprint Reading II	2
Electrn 81	Projects Laboratory	2
Physics 11	Introductory Physics	4
Chem 4	Basic Chemistry	4
		54
	General Education Requirements	11
	Total Units for Associate of Science Degree	65

SOLAR 1 Introduction to Solar Energy 2 units

This course explores: History of Solar Energy; supply capabilities of traditional energy resources; energy conservation and environmental problems. Included is an overview of: collector types; the process of converting solar insulation into thermal energy units; the effects on collector efficiency when using alternate types of collector construction; traditional and non-traditional solar applications. Class hours: 2 hours lecture.

SOLAR 2 Collectors & Energy Storage 3 units

Topics to be covered are: heat load calculations; passive solar heating principles and applications; active solar systems; hybrid (active and passive) systems; collection of solar energy for home heating and cooling; detailed studies of collector types; chemical compatibility of different collector materials and collector fluids. In addition to the appropriate integration of the above topics, the laboratory will also emphasize "hands-on" experience with related physical material. Class hours: 2 hours lecture, 3 hours laboratory.

SOLAR 3 Solar Sizing, Design and Retrofit 3 units

This course covers the solar system installation for total environment control, control systems for heating, cooling, and domestic hot water. The subject of integration of solar energy with conventional systems, sizing of systems and systems components, heating and cooling load studies will be examined. Class hours: 3 hours lecture.

SOLAR 4 Materials and Materials Handling 2 units

This course covers the procedures for properly identifying and handling of materials that are used in the construction of a solar system. Properties of materials are also investigated. This course also examines the basics of: plumbing; sheetmetal; carpentary; roofing; glazing; masonry; soldering; welding; and material compatibility. Class hours: 1 hour lecture, 3 hours laboratory.

SOLAR 5 Operational Diagnosis I 4 units

This is an integrated course of elementary electrical, electronic, and solar instrumentation theory. Sufficient material is covered so that the student may make simple measurements on individual components in a laboratory environment. Class hours: 3 hours lecture, 3 hours laboratory.

SOLAR 6 Operational Diagnosis II 4 units

This is an integrated course of advanced electrical, electronic, and solar instrumentation theory. Material from SOLAR 5 is used to reinforce the concepts of measurements and troubleshooting techniques. The student is now capable of performing a complete solar system check-out and is shown how to detect a system malfunction. Common problems that occur in a typical solar system are analyzed. Class hours: 3 hours lecture, 3 hours laboratory.

SOLAR 7 Heat Pump Theory 1 unit

The refrigeration cycle is again investigated. The course concentrates on how it is used to move hot and cold fluids (air or liquid) to achieve a reasonably pleasant and stable atmosphere. Well water and shallow pond low grade heat extraction techniques are also examined. Class hours: 1 hour lecture.

SOLAR 8 Non-Residential Applications and Future Technology 2 units

Applications of Solar Technology for use other than home heating and cooling are studied. Alternate Energy Sources are also covered. Class hours: 2 hours lecture.

SOLAR 9 Economics, Codes, Legal, Consumerism 2 units

Economics of solar energy systems and how they are affected by governmental action; methods of calculating economic cost and benefits related to both active and passive solar systems; solar system financing; lenders attitudes; customer relations; warranties; and consumer protection. Class hours: 2 hours lecture.

SOLAR 81 Solar Projects Laboratory 2 units

This course provides additional laboratory experience in the maintenance of test equipment; the design and construction of electronic and solar apparatus. A project paper is required. Class hours: 3-3 hours laboratory.

MERCED COLLEGE
3600 "M" Street
Merced, CA 95340

Jim Cox
Instructor/Counselor
(209) 723-4321

CERTIFICATE OF COMPLETION - SOLAR TECHNICIAN

CURRICULUM

Agriculture Mechanics	MA 30	3
Industrial Safety	IT 31	1
Energy Systems & Conservation	IT 39	3
Solar Energy - Residential Applications	IT 40	3
Refrigeration and Air Cond. Service and Maintenance	Refrig/Air 50	3
Fundamentals of Arc & Oxy-Acetylene Welding	WT 6	2
Print Reading & Sketching	DT 44	2
General Electricity - Electronic	ET 50	3

CORE ENERGY CLASSES

IT 39 — Energy Systems & Conservation — 3 units

This course is designed for all who need to better understand this vital topic. Energy sources, resources, supplies, electricity generation, fossil fuel engines, energy conversion and conservation will be reviewed. Solar, nuclear, tidal, geothermal, wind, ocean thermal, oil and coal are the principal topics. Three hours lecture.

IT 40 — Solar Energy - Residential Applications — 3 units

This is an introductory course to include direct and indirect techniques of heating and cooling a home. Energy conservation is stressed in the topics of water heaters, pool heaters, building air or liquid collectors, heat storage, heat distribution plus financial constraints and attractions. Three hours lecture.

MONTEREY PENINSULA COLLEGE
980 Fremont Avenue
Monterey, CA 93940

Dr. Philip Nash, Dean
Instructional Planning
(408) 646-4035

CERTIFICATE PROGRAM - ALTERNATE ENERGY TECHNICIAN

This program is presently an experimental one year full time (40 hrs./ week) CETA training project. The curriculum covers all areas of alternate energy with an emphasis on solar. The certificated technician is familiar with all aspects of the solar field including: sales, site evaluation, installation, and maintenance. Preliminary evidence indicates that this project will manifest in an abbreviated project in terms of both hours per week and the number of weeks required for student certification.

CURRICULUM

First Semester:		
Solar & Alternate Energy Systems	CTEC 200	3
Solar Systems & Energy Cons.	CTEC 295 - 1	6
Alternate Energy Practicum	CTEC 295 - 2	3
Basic Skills/Alternate Energy	CTEC 295 - 3	4
Applied Technical Mathematics	MATH 697 - 4	4
English Skills/Success in Language	ENG 271 - 8	4
Intersession:		
Architectural Blueprint Reading	Drafting 212	2
Technical Blueprint Reading	Drafting 211	2
Second Semester:		
Solar & Alternate Energy Systems	CTEC 200 - 1	3
Solar Systems & Energy Cons.	CTEC 295 - 1	6
Alternate Energy Practicum	CTEC 295 - 2	3
Basic Skills/Alternate Energy	CTEC 295 - 3	4
Applied Technical Mathematics	MATH 697	4
English Skills/Success in Language	ENG 271 - 10	4

CORE ENERGY CLASSES

CTEC 200 Solar and Alternative Energy Systems 3 units

Basic energy theory applied to the energy flow in buildings. Relevant principles of thermodynamics and practical design of solar systems for residential and commercial applications. Three hours lecture.

CTEC 295.1 Solar Systems and Energy Conservation 6 units

The study of design, fabrication and installation of flat-plate and bread box collectors used for space and water heating. Twelve hours lecture/laboratory.

MONTEREY PENINSULA COLLEGE cont'd.

CTEC 295.2 Alternate Energy Practicum 3 units

Installing alternate energy devices on public and/or private buildings. Eight hours lecture/laboratory.

CTEC 295.3 Basic Skills/Alternate Energy 4 units

Reading, writing, calculating, and communication practices as related to the field of alternate energy. Sixteen hours lecture.

MATH 697 Applied Technical Mathematics 4 units

Basic mathematical ideas of whole numbers, fractions, decimals, percents and integers and their practical applications. Application of technical and industrial formulae involving concepts of algebra, geometry and trigonometry. Four hours lecture/discussion.

ORANGE COAST COLLEGE
2701 Fairview
Costa Mesa, CA 92626

Bill Abernathy
Technology Division Chair
(714) 556-5812

CERTIFICATE IN POWER ENGINEERING
CERTIFICATE IN SOLAR ENGINEERING

CURRICULUM

Power Engineering Option:

Refrigeration Principles	ENERGY 100	2
Air Cond. Principles	ENERGY 101	2
Air Cond. Service & Repair	ENERGY 103	2
Air Cond. Controls	ENERGY 105	3
Steam Plant Operation & Main.	ENERGY 107	3
Applied Electricity	ENERGY 120	3

Select nine (9) units from the following which included with the fifteen (15) units core requirements totals twenty (20) for a certificate:

Absorption Air Cond. Systems	ENERGY 102	2
Air Distribution Balancing	ENERGY 104	2
Centrifugal Refrigeration	ENERGY 106	3
Steam Plant Operation & Main.	ENERGY 108	3
Solar Installation/Operation	ENERGY 115	3
Solar System Design	ENERGY 117	3
Energy Audit Technology	ENERGY 119	3

Solar Engineering Option:

Solar Installation/Operation	ENERGY 115	3
Solar System Design	ENERGY 117	3
Energy Audit Technology	ENERGY 119	3
Applied Electricity	ENERGY 120	3

Select eight (8) units from the following which included with the twelve (12) units core requirements totals twenty (20) for a certificate:

Refrigeration Principles	ENERGY 100	2
Air Cond. Principles	ENERGY 101	2
Air Cond. Service & Repair	ENERGY 103	2
Air Distribution Balancing	ENERGY 104	2
Air Cond. Controls	ENERGY 105	3

CORE ENERGY CLASSES

ENERGY 107 — Steam Plant Operation & Maintenance I — 3 units

Basic steam cycle, boilers and accessories, water and water treatment, turbines, heat balance and performance monitoring, nuclear powered steam plants. Three hours lecture.

ORANGE COAST COLLEGE cont'd.

ENERGY 115 Solar-Heating & Cooling 3 units

System design and application of solar equipment to heat and air condition for comfort and industrial processes. Three hours lecture.

ENERGY 117 Solar II 3 units

Solar heating and cooling of residential buildings. Sizing, installation and operation of systems. Three hours lecture.

ENERGY 119 Energy Audit Technology 3 units

The course will provide knowledge and techniques for measuring energy consumption in building envelopes, and means of conserving energy. Two hours lecture, four hours laboratory.

SACRAMENTO CITY COLLEGE
3835 Freeport Blvd.
Sacramento, CA 95822

Don Goff
Assistant Dean
(916) 449-7568

ASSOCIATES IN ARTS DEGREE - MECHANICAL-ELECTRICAL TECHNOLOGY
ALTERNATIVE ENERGY OPTION

The AA degree may be obtained by completion of a major as outlined plus General Education requirements, plus sufficient MET evening program electives to meet a 60 unit total.

CURRICULUM

Basic Technical Math	MET 102	3
Electrical Controls	MET 113	3
Alternative Energy Conservation	MET 150	3
Basic Active Solar Heating - Cooling Systems	MET 151	3
Basic Solar Photo-Voltaic and Wind Energy Systems	MET 152	3
Basic Electric Vehicle Operation and Maintenance	MET 153	3

Suggested Electives:

Mathematics of Refrigeration and Air Conditioning	MET 112	
Heating and Power Machinery	MET 121	3
Electronic Controls	MET 123	3
Air Conditioning	MET 131	3
Pneumatic Controls	MET 133	
Applied Technical Communication	TECH 60	

Along with standard General Education Requirements

CORE ENERGY CLASSES

MET 150 Alternative Energy Conservation 3 units

Basic energy theory and principles; fossil fuels, nuclear, geothermal, hydro, wind, solar, biomass, fuel-cell, co-generation energy sources and systems; energy storage systems; energy conservation practices in residential, commercial and industrial structures; energy costs.

MET 151 Basic Solar Heating-Cooling Systems 3 units

Solar energy theory; basic residential, commercial, and industrial solar heating and cooling systems; collectors - flat plate, high efficiency, concentrating and photovoltaic heat and energy storage; freeze protection; corrosion protection; maintenance; controls and accessories; pumps; tanks; piping; sizing of components; economic considerations; standards and codes.

SACRAMENTO CITY COLLEGE cont'd.

MET 152 — Basic Solar Photo-Voltaic and Wind Energy Systems — 3 units

Basic solar theory; energy overview; basic photovoltaic and wind energy theory; photovoltaic cells; charging modules, battery theory, care, and storage; inverter and cycle modules; switching devices; circuits and loads; wind energy equipment; energy storage, cycle, and switching equipment; circuits and loads; current energy laws and codes.

MET 153 — Basic Electric Vehicles — 3 units

Energy overview; typical electric passenger, commercial passenger, and commercial work vehicles; typical components of electric vehicles; DC electric motors; electric vehicle drive motors; power transmission; motor controllers; vehicle circuits and controls; battery theory and care; battery charging and protection; dynamic motor and vehicle braking; auxiliary electric vehicle devices.

MET 141 — Basic Solar Heating-Cooling Systems — 3 units

Solar energy theory; basic residential, commercial, and industrial solar heating and cooling systems; collectors - flat plate, high efficiency, concentrate and photo-voltaic; heat and energy storage; freeze protection; corrosion protection; maintenance; controls and accessories; pumps; tanks; piping; sizing of components; economic considerations; standards and codes.

SADDLEBACK COLLEGE
28000 Marguerite Parkway
Mission Viejo, CA 92692

Lee Waian, Coordinator
Environmental Studies
(714) 831-4694

SOLAR ENERGY SYSTEMS INSTALLER CERTIFICATE PROGRAM

This program is designed to train people to become solar installers and solar maintenance technicians. Students will be able to perform the plumbing, sheetmetal, electrical, and carpentry tasks associated with installation of solar collectors, water storage tanks, and connecting pipes and ducts. They will be able to perform calculations and interpret blueprint specifications on piping, duct work, and wiring. They will be able to perform maintenance and testing of solar equipment, including diagnosis of common problems, and recognizing components that need cleaning, repairing or replacing. At the completion of this training, students will be able to: assemble, operate, test and maintain solar equipment that heats water and spaces in homes, apartments, and commercial buildings.

ENERGY COURSES

SOLAR TECH 100 Introduction to Solar Energy 2 units

This course is designed to acquaint the student with the history and basic technology of solar energy utilization. The course will utilize lectures, demonstrations, practical laboratory exercises and field trips. One hour lecture/three hours laboratory.

SOLAR TECH 101 Solar Construction I 2 units

Students will learn basic solar construction techniques and the proper use of appropriate specialized tools and equipment. Practical construction projects and demonstrations will blend with lectures. One hour lecture/three hours laboratory.

SOLAR TECH 102 Solar Construction II 2 units

Students will learn advanced techniques in solar construction and the use of specialized tools and equipment. The course will provide practical laboratory experience in advanced design and construction of solar installations. One hour lecture/three hours laboratory.

SOLAR TECH 103 Domestic Hot Water Systems 2 units

Students will learn to properly size, place, and install solar collectors, storage tanks and heat exchange equipment for solar domestic water heating systems. Lab exercises will provide students with the opportunity to demonstrate competence in domestic solar hot water system installation. One hour lecture/three hours laboratory.

SADDLEBACK COLLEGE cont'd.

SOLAR TECH 104 Pool and Space Heating 2 units

This course will provide basic information and practical experience in installation techniques for swimming pool solar heating equipment. Installation techniques for space heating devices such as heat pumps will be demonstrated. One hour lecture/three hours laboratory.

SOLAR TECH 105 Solar Controls and Sensors 2 units

This course will provide information on the correct use, maintenance, and installation of solar controls and sensors. Students will learn the proper use of test equipment for testing solar equipment typically encountered in domestic solar installations. One hour lecture/three hours laboratory.

Saddleback College
28000 Marguerite Parkway
Mission Viajo, CA 92692

Lee Waian, Coordinator
Environmental Studies
(714) 831-4694

TYPE OF PROGRAM: (Certificate Program) Solar Energy Systems Installer

NUMBER OF STUDENTS: 15

DATES OF OPERATION: Program initiated May 1980

SOURCE OF FUNDS: CETA

PROGRAM DESCRIPTION: Six month training program that permits students the option of an additional three months of OJT. 25% of time devoted to classroom lecture, 75% to laboratory (hands-on).

The program is designed to train people to become solar installers and solar maintenance technicians. Students will be able to perform the plumbing, sheetmetal, electrical, and carpentry tasks associated with installation of solar collectors, water storage tanks, and connecting pipes and ducts. They will be able to perform calculations and interpret blueprint specifications on piping, duct work, and wiring. They will be able to perform maintenance and testing of solar equipment, including diagnosis of common problems, and recognizing components that need cleaning, repairing or replacing. At the completion of this training, students will be able to: assemble, operate, test and maintain solar equipment that heats water and spaces in homes, apartments, and commercial buildings.

The Solar Energy Systems Installer Certificate will be granted upon completion of the following courses that carry 18 credit units:

Solar Tech 100	Introduction to Solar Energy	2 units
Solar Tech 101	Solar Construction I	2 units
Solar Tech 102	Solar Construction II	2 units
Solar Tech 103	Domestic Hot Water Systems	2 units
Solar Tech 104	Pool and Space Heating	2 units
Solar Tech 105	Solar Controls and Sensors	2 units
Construction Tech 150	Construction Supervision and Safety	3 units
Construction Tech 135	Building Code and Law	3 units

SAN DIEGO EVENING COLLEGE
1325 12th Avenue
San Diego, CA 92101

Pat Nunn
Instructional Supervisor
(714) 238-1181

ASSOCIATE OF SCIENCE DEGREE - SOLAR TECHNOLOGY
CERTIFICATE PROGRAM - SOLAR TECHNOLOGY

Provides the skills and knowledge necessary for employment in heating, cooling, and solar industries. Includes courses in refrigeration, air conditioning, solar maintenance technology, and related instruction, to provide students with the necessary background to effectively function as a technician in the energy field.

CURRICULUM

Courses required for the certificate and for the degree:
Air Conditioning, Heating, Refrigeration and Solar
Technology 201, 203, 205, 215, 220, 226
Total 23

Additional Requirements for the A.S. degree:

Natural Sciences Social Sciences Humanities Learning Skills Select at least one course in each of the above areas.	15
American Institutions	3-6
Health Education 101	2
Physical Education (if required)	

CORE ENERGY CLASSES

TECH 201 Introduction to Heating and Air Conditioning 4 units

Fundamental terms and principles of applied solar theory, comfort cooling, refrigerant piping, remote air conditioning, and gas-fired forced air heating, including general service and test procedures. Can be taken concurrently with Air Conditioning, Heating, Refrigeration, and Solar Technology 205. Three hours lecture, three hours laboratory.

TECH 210 Electrical Controls 4 units

To impart the concept of solid state controls for heating and air conditioning systems, terms, symbols, logic diagrams, memory elements, typical devices, and to survey current commercial systems. Can be taken concurrently with Air Conditioning, Heating, Refrigeration and Solar Technology 201 and/or 205, and/or 215. Three hours lecture, three hours laboratory.

SAN DIEGO EVENING COLLEGE cont'd.

TECH 225 Solar Service, Maintenance & Technology 3 units

An introduction to solar energy with emphasis on the concepts, installation, and services related to residential solar, potable hot water, and swimming pool, spa and space heating systems. The course includes familiarity with the plumbing, electrical and mechanical component systems, and the relationship of each component to the total system. Can be taken concurrently with Air Conditioning, Heating, Refrigeration, and Solar Technology 220. Three hours lecture.

TECH 226 Advanced Solar Service Maintenance and Technology 3 units

Training in solar trouble-shooting techniques and design alterations, with emphasis on concepts of solar efficiency and cost estimating for solar heating systems. The course includes an introduction to electro/mechanical support equipment and future system design for space heating and maintenance.

SAN JOSE CITY COLLEGE
2100 Moorpark Avenue
San Jose, California 95128

John P. Haley, Jr.
(408) 298-2181

ASSOCIATE OF SCIENCE DEGREE - SOLAR TECHNICIAN
CERTIFICATE OF ACHIEVEMENT - SOLAR TECHNICIAN

A technical program designed to develop knowledge and skills in the field of solar energy. The program will give the student the necessary entry level skills for employment. Teaches electrical schematics, air conditioning and refrigeration theory as it applies to solar applications, brazing, blueprint reading, installation, maintenance and design of solar systems, and related mathematics. A student completing the suggested curriculum may seek employment as a solar technician, estimator or sales engineer.

CURRICULUM

Associate in Science Degree:

English 92, 91AB, 1A or ESL 92	3
Hist. 55 & Govt. 55 (or 21), or Hist. 17AB	6
Humanities	3
Ethnic Studies	3
Speech 10, 20, 21, 40, 41, 45 or 55 (one class)	3
Health Ed. 11 - Issues	2
P.E. - Activity	1
Physics 20 - Technical Physics	3
Phy. Sci. 19 - Solar Energy Concepts	3
Phy. Sci. 22 - Alternate Energy Sources	3
Math. 12 - Algebra I or Math. 101 - Technical Math	3
A.C. 102A - Refrig. Prin. & Heat Transfer	4
A.C. 101AB - Air Cond. Principles	8
Drafting 10 - Basic Drawing	3
Solar 110 - Active Systems	5
Solar 112 - Passive Systems	4
Environ. Studies 30 - Energy & Natural Resources	3

Certificate of Achievement:

Physics 20 - Technical Physics	3
Phy. Sci. 19 - Solar Energy Concepts	3
A.C. 101AB - Air Cond. Principles	8
A.C. 102A - Refrigeration Principles	4
Drafting 10 - Basic Drawing	3
Solar 110 - Active Systems	5
Solar 112 - Passive Systems	4

CORE ENERGY CLASSES

ENV. STUD. 30 Non-Renewable Energies & Resources 3 units

An introduction to non-renewable energy and resource issues, including the historical development of America's resource wealth and the current dilemma over dwindling conventional energies and building materials faced by our nation.

SAN JOSE CITY COLLEGE cont'd

PHY. SCI. 19 Solar Energy Concepts 3 units

Basic concepts of solar energy utilization; solar energy availability, heat transfer and storage, and active and passive solar energy systems. Introductory course for solar technician majors.

PHY. SCI. 22 Alternate Energy Sources 3 units

Theory and application of nonconventional sources of energy: alternative fuels, solar energy concentrators, water and wind electrical generation, electric storage, photovoltaic devices, solar ponds, and other contemporary topics.

SOLAR 110 Active Systems 5 units

Theory and application of active solar energy systems; design of systems for residential, pool, and hot water heating. Analysis of various types of collectors. Emphasis on practical applications. Three hours theory; six hours laboratory.

SOLAR 112 Passive Systems 4 units

Theory and application of passive solar energy systems. Design of a passive system for a residential application. Three hours theory; three hours laboratory.

SANTA ANA COLLEGE
Seventeenth at Bristol
Santa Ana, CA 92706

Donna Farmer, Dean
Applied Arts & Sciences
(714) 835-3000

ENVIRONMENTAL STUDIES - Energy Technology Degree (249) and Certificate (499) Option

The associate degree and certificate curriculum in energy technology prepare students for entry into the field of alternate energy technicians in installation and service, and as basic solar design technicians.

CURRICULUM

Major requirements for the associate in science degree and requirements for the certificate:

Solar Energy Technology I	Env. St. 151	3
Solar Energy Technology II	Env. St. 152	3
Solar Energy, Sources & Principles	Env. St. 153	3
Wiring, Circuitry, and Control for Solar Applications	Env. St. 154	3
Energy Resources, Present and Future	Env. St. 155	3
Plumbing, Ducting & Installation	Env. St. 156	3

Recommended electives: eight (8) chosen from the following list:

Power Generation & Transmn.	Env. St. 157	3
Geothermal Energy Resources	Env. St. 160	3
Aquaculture & Hydroponics	Env. St. 161	2
Biomass & Energy Production	Env. St. 162	1
Energy: Problems & Decisions	Env. St. 163	2
Topics in Environmental Studies	Env. St. 198	1
Environment of Man	Env. St. 200	3
Wastewater Management	Env. St. 107	3
Introduction to Management	Management 050	3
Public Works Administration	Public Works 060	3
Water Mathematics & Hydraulics	Env. St. 050	3
Water Sources & Conservation	Env. St. 207	2

CORE ENERGY CLASSES

Environmental Studies 151 Solar Energy Technology 1 3 units

Basic principles of active and passive solar energy systems. Needs methods of energy conservation. Design, contruction, and operation of a practical active domestic water heating system. Design of swimming pool and hot tub solar heating systems. Not offered every semester. Class hours: 3 lecture.

Environmental Studies 152 — Solar Energy Technology II — 3 units

Insulation and thermal storage calculations for active and passive structures. Design and construction of attached passive greenhouse for home heating. Not offered every semester. Class hours: 3 lecture.

Environmental Studies 153 — Solar Energy, Sources and Principles — 3 units

Introduction to the basic principles of solar energy. Information as to how the sun's energy may be utilized directly in active, passive, and photovoltaic systems, or indirectly as with wind, tidal, and biomass energy. Efficient cost and environmental impacts of various solar systems will be studied. Not offered every semester. Class hours: 3 lecture.

Environmental Studies 154 — Wiring, Circuitry, and Control for Solar Applications — 3 units

Solar energy system operations. Provides necessary theory and practice to perform basic design, operations, maintenance, and repair of electrical circuitry. Not offered every semester. Class hours: 3 lecture.

Environmental Studies 155 — Energy Resources, Present and Future — 3 units

An introduction to present and future energy resources. A survey of present fossil fuels and future energy resources, such as solar, nuclear, geothermal, and synfuel. Economic, social, political, and environmental impacts of each resource will be discussed. Not offered every semester. Class hours: 3 lecture.

Environmental Studies 156 — Plumbing, Ducting, and Installation — 3 units

Design, installation, maintenance, and repair of piping and ducting for active and passive systems. Not offered every semester. Class hours: 3 lecture.

Environmental Studies 157 — Power Generation and Transmission — 3 units

Present and future energy sources for direct use and for electrical power generation. Transmission of energy by grids, pipelines, and other methods. Not offered every semester. Class hours: 3 lecture.

Environmental Studies 160 Geothermal Energy Resources 3 units

Origin, occurrence, and movement of hot water, steam, and associated minerals in geothermal areas. Uses of geothermal energy and its environmental and economic costs. Not offered every semester. Class hours: 3 lecture.

Environmental Studies 162 Biomass and Energy Production 1-3 units

An introduction to the use of biological materials as energy sources. Included will be information on how methane, alcohol, and other fuels could be produced from plant and animal materials. Not offered every semester. Class hours: 1-3 lecture.

Environmental Studies 163 Energy - Problems and Decisions 1-2 units

A humanistic approach to the energy issue, its effects on the way we live, its policy options and trade-offs as viewed by historians, social scientists and natural scientists. Includes a public hearing, a field trip, and discussion of local issues. Not offered every semester. Class hours: 9 weeks, 3 lecture.

SIERRA COLLEGE
5000 Rocklin Rd.
Rocklin, CA 95677

Martin E. Jack, Jr.
Dean of Instructional Services
(916) 624-3333

ENERGY MANAGEMENT TECHNICIAN - CERTIFICATE AND ASSOCIATE DEGREE PROGRAM

The Energy Management Technician Curriculum is designed: (1) to provide students with technical competencies to gain employment as an energy manager or technician in entities, private or public, that desire reduced consumption or conservation of energy sources; (2) to upgrade skills of those currently employed in positions of building maintenance, facilities control, or energy consumption control; and (3) to provide energy consumers with the competencies to reduce energy use in their private lives.

CURRICULUM

Requirements for Certificate:

	Units
E.M. 10 Energy Management Principles	3
E.M. 20 Applied Energy Economics	3
E.M. 30 Energy Management and Human Behavior	3
C.T.R. 64 Low Cost Low Energy Housing	3
D.T. 8 Blueprint Reading and Sketching	3
Physics, 10 Descriptive Physics	3
Wat. Tech. 1 Introduction to Domestic Water Supplies	3
	21

Requirements for Associate Degree

E.M. 10 Energy Management Principles	3
E.M. 20 Applied Energy Economics	3
E.M. 30 Energy Management and Human Behavior	3
C.T.R. 40 Building Industry Analysis	3
C.T.R. 60 Residential House Wiring	3
C.T.R. 64 Low Cost Low Energy Housing	3
Wat. Tech. 1 Introduction to Domestic Water Supplies	3
D.T. 8 Blueprint Reading and Sketching	3
Ag. 35A or Ag. 35B or Ag. 120A or Ag. 120B Identification and Ecology of Ornamental and Native Plant Materials	3
	27

Recommended Electives for Associate Degree

Physics 10 Descriptive Physics	3
Physics 28 Special Problems in Physics	2-6
C.T.R. 62 Plumbing Installation and Design	3
C.T.R. 66 Solar Energy Housing	3
C.S. 10 Introduction to Computing	3
E.T. 10 Basic Passive Circuits	5
Int. 1 The Environment and the Human Impact	3
Math A Elementary Algebra	3

SIERRA COLLEGE, cont'd.

Engl. A Mechanics and Basic Composition or
Engl. 1A Composition and Literature. 3
Bus. 85 Oral Communication for Business or
Pub. Spk. 1A Fundamentals of Public Speaking 3
Psych. 1 Introduction to Psychology or
Psych. 12 Contemporary Psychology. 3

CORE ENERGY CLASSES

EGY. MGT. 10 ENERGY MANAGEMENT PRINCIPLES 3 units

An overview of primary energy forms, their history present and future worth, as relates to public, commerce and industry. Energy as it relates to architecture, engineering and public agencies. For beginning students and those who are now in energy-related occupations.
Class hours: 3 hours lecture

EGY. MGT. 20 APPLIED ENERGY ECONOMICS 3 units

Course includes life cycle costs of basic energy and how it is affected by socio-political actions, regulatory agencies, and business plans.
Class hours: 3 hours lecture

EGY. MGT. 30 ENERGY MANAGEMENT AND HUMAN BEHAVIOR 3 units

Application of knowledge and techniques of the social and behavorial sciences to the solution of practical problems encountered in energy management. Includes study of attitudes toward energy consumption, sources or resistance to energy-conserving measures and techniques for modifying energy-related behavior. Field research projects.
Class hours: 3 hours lecture

C.T.R. 64 LOW COST LOW ENERGY HOUSING 3 units

A study of the various methods of conserving home energy: heating, cooling, weatherization, building standards, low energy systems, etc.
Class hours: 3 hours lecture

C.T.R. 66 SOLAR ENERGY HOUSING 3 units

A study of heating, cooling and solar systems: building standards, wind power, low energy systems, and alternate forms of energy.
Class hours: 3 hours lecture

VISTA COLLEGE
2020 Milvia Street, Suite 200
Berkeley, CA 94704

Michael B. Mills
Program Planner
Alternative Technology/
Environmental Management
(415) 841-8431

ASSOCIATE OF SCIENCE DEGREE IN ENERGY TECHNOLOGIES
WITH AN OPTION IN SOLAR OR CONSERVATION TECHNOLOGIES

This program will go into effect Fall, 1980.

CURRICULUM

Major requirements for the A.S. Degree with a solar option:

Ecology 5	3
ET 51: Energy Options	3
Chemistry 1A	5
ET 53: Solar Energy I	3
Chemistry 1B	5
Math 1A	4
ET 54: Solar Energy Systems II	3
ET 56: Energy Auditing	2
Ecology 30	3
ET 99A: Field Studies	1-5
ET 57: Shelter Design	3
ET 58: Construction/Design and Maintenance of Solar Devices	6
ET 99B: Field Studies	1-5
General Education/Electives	2-

Major requirements for the A.S. Degree with a conservation option:

Ecology 5	3
ET 51: Energy Options	3
Chemistry 1A	5
ET 53: Solar Energy I	3
Chemistry 1B	5
Math 1A	4
ET 54: Solar Energy System II	3
ET 56: Energy Auditing	2
Ecology 30	3
ET 99A: Field Studies	1-5
ET 60: Resource Dev. Admin.	3
LUM 54: Env. Impact Report	3
Chemistry 10	3
ET 99B: Field Studies	1-5
General Education/Electives	2-

ENERGY COURSES

ET 51 Energy Options 3 units

According to many energy experts, oil and gas reserves will last for another 25 years at the most. This course will survey the many alternatives to our traditional energy style as well as examine the validity of the energy crisis itself and the need for national energy policy. Three hours lecture.

ET 53 Solar Energy Systems I 3 units

Introduction to the theory of solar energy capture and conversion and methods for its use in the heating and cooling of homes, and in the heating of domestic water supply. Topics will include basic solar concepts and engineering principles, sizing systems, operation and construction of water heating systems, passive and active systems for heating and cooling, attached greenhouses, cost considerations, choosing the commercial system appropriate to your application. Three hours lecture.

ET 54 Solar Energy Systems II 3 units

An advanced course in the design, engineering, installation and monitoring of solar energy systems for heating homes, domestic water supply and swimming pools. Topics include system selection, heat loss calculations, engineering methods, installation procedures, and methods to monitor thermal performance of system. This course is intended for students interested in pursuing employment in the solar energy field. Three hours lecture.

ET 55 Solar Energy Systems III 3 units

An advanced course in the design, engineering, installation and monitoring of solar energy systems for the heating, cooling, and water supplies of institutions, office buildings and apartment complexes. Recommended for students pursuing a major or certificate in Energy Technologies (Solar option). Three hours lecture.

ET 56 Energy Auditing 2 units

An intensive examination of household energy usage, conservation, design and rehabilitation. Topics covered include energy concepts, heat loss calculations, basic solar concepts, site selection, design improvements, appliances and utility systems. Two hours lecture.

ET 57 Shelter Design 3 units

An introduction to the techniques and technologies of home construction and renovation from the point of view of resource conservation and solar energy employment. Topics include siting of a new home or determining the value of an existing home, basic design considerations of floor plans, material usage, structural engineering, fenestration, etc. Passive use of solar energy will be emphasized. Methods of tailoring design to building codes will be discussed. Three hours lecture.

ET 58 Construction/Design & Maintenance of Solar Devices 6 units

The techniques of design, construction and maintenance of solar devices. Required for those students pursuing either a certificate or a degree in Energy Technologies (Solar option). Four hours lecture/six hours laboratory.

ET 60 — Resource Development and Administration — 3 units

An introduction into the decision-making and enforcement apparatus which is concerned with the administration of our energy resources. This course is required for those students who are pursuing either a degree or certificate in Energy Technologies (Conservation option). Three hours lecture.

ET 61 — Politics of Energy — 3 units

An examination of the administrative rules, regulations, procedures and politics which influence the use of energy. Recommended for students pursuing a certificate or a major in the Conservation option. Three hours lecture.

ET 63 — Solar Electronics — 3 units

The application of basic electronic principles to solar systems. Topics include generation of electric power with solar systems. Topics include generation of electric power with solar cells, installation and operation of solar controls and the use of electronic instruments for testing and monitoring solar systems. Offered jointly with Laney College. Two hours lecture/three hours laboratory.

ET 80 — Solar Greenhouse Design — 1 unit

Practical course in the design and management of solar greenhouses for homesite, community and commercial production of food plants. Recommended for solar greenhouse construction. Three hours lecture.

ET 81 — Solar Greenhouse Construction — 1 unit

Practical course in the construction of a solar greenhouse for home site, community and commercial production of food plants and ornamentals. This course is a follow-up to solar greenhouse design and management. Three hours lecture.

ET 83 — Wind Energy Systems I — 1 unit

An introduction to wind energy systems. Class will learn about the history of wind-powered devices, their evolution and refinements. Technical aspects of wind-generator design through such parameters as power-coefficients, tip-speed ratio, and drag vs. lift designs. Further topics include wind siting, details of water pumping systems and wind-electric generators in detail.

ET 84 Wind Energy Systems II 1 unit

An advanced course on wind energy systems. Class will learn in greater detail the technical aspects of generator design through the interrelation of power-coefficients and tip speed ratio. Testing and evaluating the performance of various air foils on a wind generator main frame utilizing compressor, hydraulic pumps, and alternators as a load. Further discussion of sail wind designs, introduction to the Darrieus and Giromill rotor. Eighteen hours total.

ET 90 House Tuning 1 unit

Instruction in methods of energy, water and production of wastes in the homes. Topics include weatherizing, insulation, appliance efficiency checks, plumbing checks, reducing waste at the market and in the kitchen, grey water recycling and composting. Three hours lecture.

ET 91 Institutional Energy Auditing 1 unit

This course is designed to provide assistance for improving the energy efficiency of existing equipment and for identifying and implementing cost effective energy saving in buildings and equipment. Sources of funds to assist in implementing changes will be identified. Three hours lecture.

ET 98 Selected Topics .5 units

Designed to permit investigation in depth of topics not covered by regular catalog offerings. Course content, hours, and unit credit to be determined by the appropriate department in relation to community-student interest and/or available staff. May be offered as a seminar, lecture, or laboratory class.

ET 99AB Field Studies 2-10 units

Directed studies for students working in the Energy Technologies field. Required for students majoring in Energy Technologies.

SECTION 2 COURSE OFFERINGS

College Name	Course Title	Catalog Title	Units
College of Alameda 555 Atlantic Avenue Alameda, CA 94501	No applicable courses offered 1979/80		
Allan Hancock College 800 South College Drive Santa Maria, CA 93454 Ted S. Sypolt, Assoc. Dean Applied Arts & Sciences Dick Dickson (805) 922-6966	Solar Energy	(X)	(X)
American River College 4700 College Oak Drive Sacramento, CA 95841 Ron Kong, Assoc. Dean of Instruction (916) 484-8011	Solar Energy	Natural Science 25	3
Antelope Valley College 3041 West Avenue K Lancaster, CA 93534 Frank C. Roberts, Dean of Technical Education (805) 943-3241	Everyday Energy	PHY SCI 52	3
Bakersfield College 1801 Panorama Drive Bakersfield, CA 93905 Harriet Sheldon (805) 395-4421	Solar Heating and Cooling of Residential Buildings	Solar I	3
Barstow College 2700 Barstow Road Barstow, CA 92311 Richard H. Reeb, Jr. Ass't. Dean - Academic (714) 252-2411	Introduction to Residential Solar Energy	PHY SCI 5	4
Butte College Route 1, Box 183A Oroville, CA 95965 Raymond D. Carrozza (916) 895-2485	Solar Energy Systems - Designs & Appli. Solar Hot Water - Systems, Designs, and Installations	TECH 280 TECH 281	3 (X)

* (X) - Information not available.

* Cabrillo College 6500 Soquel Drive Aptos, CA 95003 David Burton, Coordinator Solar Energy Tech. Program (408) 425-6235 Jack Snyder, Dean Occupational Education (408) 425-6000	Fundamentals of Solar Energy	SET 50	3
	Solar Tech. & Fab. I	SET 51	4
	Solar Tech. & Fab. II	SET 52	4
	Solar Home Design	SET 53	3
	Solar Architecture	SET 54	3
	Solar Remodeling I	SET 55	2
	Solar Remodeling II	SET 56	2
	Solar Energy in Agri.	SET 57	4
	Appli. of Solar Energy in Agriculture	SET 58	2
	Solar Electronics	SET 59	2
	Wind Energy	SET 60	2
	Solar Energy - Comm. Studies	SET 61	2
	Solar Field Studies	SET 62AB	2-1
	Special Studies	SET 10S	2-2
Canada College 4200 Farm Hill Blvd. Redwood City, CA 94061 John H. Rhoads, Director Administrative Services (415) 364-1212	Intro. to Solar Heat.	(X)	(X)
College of the Canyons 26455 N. Rockwell Canyon Rd. Valencia, CA 91355	No applicable courses offered 1979/80		
Cerritos College 11110 East Alondra Blvd. Norwalk, CA 90650 Dean Paige, Assoc. Dean Science, Eng., & Math. Division (213) 860-2451	Solar Heat. Install.	Solar I	3
	Solar Heat. Design	Solar II	3
* Cerro Coso College Ridgecrest, CA 93555 Robert L. Takacs Campus Coordinator Solar Energy Technology Program (714) 375-5001	Intro. to Solar Energy	SET 55	2
	Collectors & Energy Storage	SET 56	3
	Solar Sizing Design & Retrofit	SET 57	2
	Materials & Mat. Handling	SET 58	3
	Operational Diagnosis	SET 59	3
	Non-Res. Appli. & Future Technology	SET 62	3
	Tech. Survey of Energy Sources	SET 63	2
	Eco., Codes, Legal, Consumerism	SET 64	2

*Refer to Section I of syllabus for more information.

Chabot College Hayward Campus 25555 Hesperian Blvd. Hayward, CA 94545 Richard Avelar Arch. Instructor (415) 786-6854	Solar Architecture	ARCH 68	(X)
Chabot College Valley Campus 3033 Collier Canyon Rd. Livermore, CA 94545 Barbara Mertes, Dean (415) 455-5300	Solar Heat. Fund.	ENG TECH 10	3
* Chaffey College 5885 Haven Avenue Alta Loma, CA 91701 William D. Hunt Solar Program Coordinator (714) 987-1737 Ext. 412 or 405	Orientation to Solar Technology	ST 50	1
	Intro. to Solar Tech.	ST 500	4
	Solar Hydronic Sys.	ST 502	3
	Solar Air System	ST 504	3
	Solar Heat Transfer	ST 520	4
	Solar Sizing	ST 522	4
	Blue Print Reading & Sketching	ST 524	2
	Solar Energy Seminar	ST 526	2
	Energy & Society	SOC SCI 602	(X)
Citrus College 18824 E. Foothill Blvd. Azusa, CA 91702 George Bratt (213) 335-0521, ext. 379	Alt. Energy Sources	PHY SCI 102	3
	Solar Heat Install.	PUB SER 200	2
* Coastline Community College 10231 Slater Avenue Fountain Valley, CA 92808 S. Arthur Martinez Assoc. Dean - Area IV (714) 898-9871	Principles of Energy Management	Energy 300	3
	Lighting Sys. Designs	Energy 301	3
	System Analysis for Energy Management	Energy 302	3
	Energy Mgmt. & Human Behavior	Energy 303	3
	Equip. Appli. for Env. Control	Energy 310	3
	Energy Mgmt. Plan.	Energy 320	3
	Energy Mgmt.	En. Mgmt. 100	3
	Practical Eng. Eco.	En. Mgmt. 101	3
	Environmental Equip.	En. Mgmt. 210	3

* Refer to Section I of syllabus for more information.

Columbia College P.O. Box 1849 Columbia, CA 95310 Ross Carkeet, Jr. (209) 532-3141	Alt. Energy Sources: Solar & Wind	NAT RES 105	3
	Alt. Energy Sources: Methane, Water, Geothermal, Etc.	NAT RES 106	3
Compton Community College 1111 E. Alondra Blvd. Compton, CA 90221	No applicable courses offered 1979/80		
*Contra Costa College 2600 Mission Bell Drive San Pablo, CA 94806 Robert Martincich Dean of Instruction (415) 235-7800	Alt. Energy Resources	ENG 110	3
	Energy Dilemma	PHY 114	3
	Nuclear Energy, It's Problems & Potential	PHY 115	3
	Solar Energy	ENV DES 115	3
	Thermal Insulation	ENV DES 116	3
	Energy Conservation in the Home	Home Eco. 115	3
* Cosumnes River College 8401 Center Parkway Sacramento, CA 95823 Robert Gari Harold House (916) 421-1000	Intro. to Solar Energy Systems	ENV DES 31	2
	Solar Heated Water Sys. for the House	ENV DES 32	2
	Intro. to Solar Collector Const.	ENV DES 33	1
	Res. Energy Cons.	ENV DES 46	1½
	Alt. Energy Systems	ENV DES 47	1½
	Solar Energy Appliance Constr. & Install.	ENV DES 71	3
Crafton Hills College 11711 Sand Canyon Rd. Yucaipa, CA 92399	No applicable courses offered 1979/80		
Cuesta College P.O. Box J San Luis Obispo, CA 93406 Edwin M. Pearce Dean of Instruction (805) 544-2943	Appli. of Solar Energy Systems	CT 60	4
Cuyamaca College 2950 Jamacha Road El Cajon, CA 92020 Donald J. Ferris Coordinator, Industrial Tech. (714) 464-1980	Energy Sources & Power Distribution	ENGR 111	3
	Solar Appli.: Home & Industry	IND TECH 299	(X)

* Refer to Section I of syllabus for more information.

Cypress College 9200 Valley View St. Cypress, CA 90630	No applicable courses offered 1979/80		
De Anza College 21250 Steven Creek Rd. Cupertino, CA 95014 R. Kent Dean of Sciences (408) 996-4567	Utilization of Solar Energy	ENG 369	3
	Design of Solar Energy Sys.-Heat. & Cooling	ENG 379A	2
	Design of Solar Energy Sys.-Heat. & Cooling	ENG 379B	2
	Solar Energy for the Consumer	IND TECH 60A	1
	Solar Energy for the Homeowner	IND TECH 60B	4.5
College of the Desert 43-500 Monterey Ave. Palm Desert, CA 92260 John Marzicloa, ext. 201 Bruce Usher, ext. 290 (714) 346-8041	Intro. to Solar Energy	ARCH 13	(X)
	Solar Technology I	EnRe 60	3
	Solar Technology II	EnRe 61	3
Diablo Valley College 321 Golf Club Road Pleasant Hill, CA 94523 John G. Kelly Dean of Instruction (415) 685-1230	Flat Plate Solar Collector Heat. Sys.	AIR COND 150	(X)
	Buildings & the Energy Problem	ENG 150	3
East Los Angeles College 1301 Brooklyn Ave. Monterey Park, CA 91754	No applicable courses offered 1979/80		
El Camino College 16007 Brooklyn Ave. Via Torrance, CA 90506 Ed J. Murashi, Dean Occupational Education (213) 532-3670	Solar Heating/Air Cond.	AIR COND 20	(X)
	Contruction Tech.	CON TECH 1/4	(X)
Evergreen Valley College 3095 Yerba Buena Road San Jose, CA 95212	No applicable courses offered 1979/80		
Feather River College P.O. Box 1110 Quincy, CA 95971 Bill Martin, Instructor (916) 283-0202	Solar Utilization & Energy-Wise Const.	NAT RES 75	2
	Alt. Energy Lab	Forestry 95A	(X)

Foothill College 12345 El Monte Road Los Altos Hills, CA 94022	Resource Mgmt. in Env. Natural Resources & Env. Sci.	ENV STUD 3 ENV STUD 4	4 4

Don Leach
Eng. Dept. Chair
(415) 948-8590

Fresno City College 1101 E. University Ave. Fresno, CA 93741	Solar Energy Solar Systems	SOC SCI 47 AIR COND 55	2 3

Richard M. DeKoning, Tech-Ind Division, ext. 8778
Dennis C. Wash, Tech-Ind Division, ext. 8523
(209) 442-4600

Fullerton College
321 E. Chapman Avenue
Fullerton, CA 92634

No applicable courses offered 1979/80

Gavilan College 5055 Santa Teresa Blvd. Gilroy, CA 95020	Principles of Solar Energy Sys. Install. Solar Heat. Systems	CON TECH 66A CON TECH 66B	3 3

Herb Ellenburg, Division Chair
Occupational Education
(408) 847-1400

Glendale College 1500 N. Verdugo Road Glendale, CA 91208	Energy	TECH 101	1

David Davenport
(213) 240-1000, ext. 312

Golden West College 15744 Golden West St. Huntington Beach, CA 92708	Applied Solar Energy	PHY SCI 115	2

Gene Tardy, Associate Dean
Voc. Ed. & Instr. Development
(714) 892-7711

Grossmont College
8800 Grossmont College Dr.
El Cajon, CA 92020

No applicable courses offered 1979/80

Hartnell College 156 Homestead Avenue Salinas, CA 93901	No applicable courses offered 1979/80		
*Imperial Valley College P.O. Box 158 Imperial, CA 92251 Philip E. Champagne Alternate Energy Coordinator (714) 352-8320	Alt. Energy Tech. Training	CETA	(X)
	Alcohol Fuels Production	(X)	2
Indian Valley College 1800 Ignacio Blvd. Novato, CA 94947	No applicable courses offered 1979/80		
Lake Tahoe Community College 2659 Lake Tahoe Blvd. So. Lake Tahoe, CA 95702 Roger Welt Assoc. Dean of the College (916) 541-4660	Solar Energy (Intro.)	PHY SCI 115	(X)
	Passive Solar for Builders	PHY SCI 131	(X)
	The Self-Sufficient Home	PHY SCI 131	(X)
Laney College 900 Fallon Street Oakland, CA 94607	No applicable courses offered 1979/80		
Lassen College P.O. Box 3000 Susanville, CA 96130 Jim Sweet (916) 257-6181, ext. 230	Alt. Sources of Energy	PHY SCI 10	1
Long Beach City College 4901 East Carson St. Long Beach, CA 90808 Les Harris, Dean Occupational Education (213) 420-4111	Energy for the Future	ENV SCI 1	3
Los Angeles City College 855 North Vermont Ave. Los Angeles, CA 90029	No applicable courses offered 1979/80		

*Los Angeles Harbor College 1111 Figueroa Place Wilmington, CA 90744	No applicable courses offered 1979/80		
Los Angeles Mission College 1101 San Fernando Road San Fernando, CA 91340	No applicable courses offered 1979/80		
Los Angeles Pierce College 6201 Winnetka Avenue Woodland Hills, CA 91371	No applicable courses offered 1979/80		
Los Angeles Southwest College 1600 W. Imperial Highway Los Angeles, CA 90047	No applicable courses offered 1979/80		
Los Angeles Trade Tech. 400 W. Washington Blvd. Los Angeles, CA 90015 Dr. Neal Adams, Instructor (213) 746-0800, ext. 273	Solar Energy Energy Mgmt. in Bldgs.	EN MGMT 188 EN MGMT 189	3 3
Los Angeles Valley College 5800 Fulton Avenue Van Nuys, CA 91401 Phyllis S. Stones Ass't. Dean of Instruction (213) 781-1200	Solar Energy Tech I Solar Energy Tech II	(X) (X)	(X) (X)
Los Medanos College 2700 E. Leland Road Pittsburg, CA 94565 Stanley H. Chin Dean of Nat. Sci. & Related Occupations (415) 439-2181	An Ethical Inquiry Into The Societal Issues of Energy Solar Energy & You Solar Energy & Conservation	PHY SCI 3TG PHY SCI 97 BIO SCI 97t	3 1 2
College of Marin Kentfield, CA 94904 Don Martin (415) 457-8811	Energy Efficient Des. & Alt. Energy Sources Solar Energy Utili. Energy & The Way We Live	ADULT ED ADULT ED NEWSPAPER	(X) (X) 3

Mendocino College P.O. Box 3000 Ukiah, CA 95482 Raymond D. Liedlick Dean of Instruction (707) 462-0571	Energy	PHY SCI 94	(X)
* Merced College 3600 M Street Merced, CA 95340 Jim Cox, Instructor (209) 723-4321	Energy Sys. & Cons. Solar Energy - Res. Application	IT 39 IT 40	3 3
Merritt College 12500 Campus Drive Oakland, CA 94619 Lloyd G. Baysdorfer Ass't. Dean of Instruction (415) 531-4911	Surviving the Energy & Resource Crises Household Self-Reliance Alt. Energy Sources Appropriate Tech. Lab Solar Energy for the Home	BIO SCI 48A ECOLOGY 48A ECOLOGY 48C ECOLOGY 48D ECOLOGY 48F	3 1 1 1 1
Mira Costa College One Barnard Drive Oceanside, CA 92054	No applicable courses offered 1979/80		
Mission College 3000 Mission College Blvd. Santa Clara, CA 95050 Dr. T. A. Thode (408) 988-2200	Energy	(X)	3
Modesto College College Avenue Modesto, CA 95350 Bill Wilson, Doug Beaman, Ron Alves (209) 526-2000	Energy Solar Energy Appli. Energy & The Way We Live	PHY SCI 163/63 PHY SCI 60/368 POL SCI 198	3 3 1
* Monterey Peninsula College 980 Fremont Avenue Monterey, CA 93940 Dr. Philip Nash Associate Dean Instructional Planning (408) 646-4035	Solar & Alternate Energy Systems Solar Sys. & Energy Conservation Alt. Energy Practicum Basic Skills/Alt. Energy	CTEC 200 CTEC 295/1 CTEC 295/2 CTEC 295/3	3 6 3 4

* Refer to Section I of syllabus for more information.

Moorpark College 7075 Campus Road Moorpark, CA 93021	No applicable courses offered 1979/80		
Mt. San Antonio College 1100 N. Grand Avenue Walnut, CA 91789 Irvin Colt Admin. Dean, Occ. Programs (714) 594-5611	Solar & Alt. Energy Sources	AIRC 70	3
	Solar Energy Systems Installation	AIRC 71/71L	3
	Energy Options and Issues	PHSC 20	3
	Solar Energy	PHSC 22	1
	Geothermal Energy	PHSC 24	1
	Nuclear Energy	PHSC 26	1
Mt. San Jacinto College 21-400 Highway 79 San Jacinto, CA 92383 Benton Caldwell, Dean Vocational Instruction (714) 654-7321	Solar Energy Appli.	ENGR 4	3
	Solar Collector Des.	ENGR 6	3
	Solar System Design	ENGR 7	3
Napa College 2277 Napa-Vallejo Highway Napa, CA 94558	No applicable courses offered 1979/80		
Ohlone College P.O. Box 3909 Fremont, CA 94538 Dr. Neil McCallum Dean of Instruction (415) 657-2100	Personal Use of Solar Energy	CFS 45A	3
* Orange Coast College 2701 Fairview Road Costa Mesa, CA 92626 Bill Abernathy Technology Division Chair (714) 556-5812	Energy Sources	Energy 111	2
	Passive Solar Design	Energy 112	3
	Solar Installation - Operation	Energy 115	3
	Solar System Design	Energy 117	3
	Energy Audit Tech.	Energy 119	3
	Solar Applications	Energy 121	3
Oxnard College P.O. Box 1600 Oxnard, CA 93032 Fernando Cuevas Division Director for Math/Science (805) 488-0911	Intro. to Weather. & Climate	GEO 103	3
	Energy Cons. & Alt. Energy Sources	ECO 1	(X)

* Refer to Section I of syllabus for more information.

Palo Verde College 811 W. Chanslorway Blythe, CA 92225 Dr. Margaret H. Arter Dean of Instruction (714) 922-6168	Energy Cons./Alt. Energy Sources	PHY SCI 39	(X)
Palomar College 1140 W. Mission San Marcos, CA 92069	No applicable courses offered 1979/80		
Pasadena City College 1570 Colorado Blvd. Pasadena, CA 91106 Vernon Spaulding (213) 578-7301	Energy Sources, Resources, & Uses	ENERGY 100	3
	Energy Management in Structures	ENERGY 102	3
Porterville College 900 South Main Street Porterville, CA 93257	No applicable courses offered 1979/80		
College of the Redwoods Eureka, CA 95501 Dr. David Mills (707) 443-8411, ext. 424	Energy Savings in Construction	CON TECH 73	(X)
	Uses of Energy	ENV SCI 15	(X)
	Solar Heating A	ENV SCI 20A	1
	Solar Heating B	ENV SCI 20B	1
	Solar Heating C	ENV SCI 20C	1
Reedley College 955 North Reed Ave. Reedley, CA 93654	No applicable courses offered 1979/80		
Rio Hondo College 3600 Workman Mill Road Whittier, CA 90608	No applicable courses offered 1979/80		
Riverside City College 4800 Magnolia Avenue Riverside, CA 92506 Jerry Carter, Instructor (714) 684-3240	Solar Energy Appli.	AC 52A	5
* Sacramento City College 3835 Freeport Blvd. Sacramento, CA 95822 Don Goff, Ass't. Dean Technology Division (916) 449-7568	Basic Solar Heating & Cooling Systems	MET 141	3
	Alt. Energy Cons.	MET 150	3
	Basic Active Solar Heat.-Cool. Systems	MET 151	3
	Basic Solar Photo-Voltaic & Wind Energy	MET 152	3
	Basic Electric Vehicles	MET 153	3

* Refer to Section I of syllabus for more information.

*Saddleback College 28000 Marguerite Parkway Mission Viejo, CA 92692 Lee Waian, Coordinator Environmental Studies (714) 831-4694	Intro. to Solar Energy Solar Construction I Solar Construction II Domestic Hot Water Systems Pool & Space Heating Solar Controls & Sensors	SOLAR TECH 100 SOLAR TECH 101 SOLAR TECH 102 SOLAR TECH 103 SOLAR TECH 104 SOLAR TECH 105	2 2 2 2 2 2
Saddleback College North Campus 5500 Irvine Center Drive Irvine, CA 92714	No applicable courses offered 1979/80		
San Bernardino Valley College 701 S. Mt. Vernon Ave. San Bernardino, CA 92403 Jim Wheaton, Instructor Harry Smith, Dean of Instruction (714) 888-6511	Solar Energy - Tech. & Maintenance	REFRIG 148	4
* San Diego City College 1313 Twelfth Ave. San Diego, CA 92101 Walter DeFelice, Jr. (714) 280-7601	Solar Service, Main., & Technology Adv. Solar Service, Main., & Technology	TRADE/TECH 225 TRADE/TECH 226	3 3
San Diego Mesa College 7250 Mesa College Drive San Diego, CA 92111 Robert B. McCommins Dean of Administration (714) 279-2300	Utilization of Solar Energy	CON TECH 215	4
San Diego Miramar College 10440 Black Mountain Rd. San Diego, CA 92126	No applicable courses offered 1979/80		
City College of San Francisco 50 Phelan Avenue San Francisco, CA 94112	No applicable courses offered 1979/80		
San Joaquin Delta College 5151 Pacific Ave. Stockton, CA 95207	No applicable courses offered 1979/80		

*Refer to Section I of syllabus for more information

* San Jose City College 2100 Moorpark Ave. San Jose, CA 95128 John P. Haley, Jr. (408) 298-2181	Solar Energy Concepts	PHY SCI 19	3
	Alt. Energy Sources	PHY SCI 22	3
	Energy & Natural Res.	ENV STUD 30	3
	Active Systems	SOLAR 110	5
	Passive Systems	SOLAR 112	4
College of San Mateo 1700 W. Hillsdale Blvd. San Mateo, CA 94402	No applicable courses offered 1979/80		
* Santa Ana College Seventeenth at Bristol Santa Ana, CA 92706 Bruce Alexander Env. Tech., Dept. Chair (714) 835-3000	Solar Energy Tech I	ENV STUD 151	3
	Solar Energy Tech II	ENV STUD 152	3
	Solar Energy Sources & Principles	ENV STUD 153	3
	Wiring Circuitry & Control for Solar Application	ENV STUD 154	3
	Energy Resources, Present & Future	ENV STUD 155	3
	Power Generation & Transportation	ENV STUD 157	3
	Geothermal Energy Res.	ENV STUD 160	3
	Biomass & Energy Prod.	ENV STUD 162	1
	Energy: Problems & Decisions	ENV STUD 163	2
Santa Barbara City College 721 Cliff Drive Santa Barbara, CA 93109	No applicable courses offered 1979/80		
Santa Monica College 1900 Pico Blvd. Santa Monica, CA 90405	No applicable courses offered 1979/80		
Santa Rosa Junior College 1501 Mendocino Ave. Santa Rosa, CA 95401 Charles Belden Assoc. Dean, Occ. Ed. (707) 524-4252	Getting Into Hot Water Through Solar Heating	COM SER 28	(X)
College of the Sequoias 915 S. Mooney Blvd. Visalia, CA 93277 Richard Petrell, Instructor David Bockman, Dean of Voc. Ed. (209) 733-2050	Solar Applications	PHY SCI 14	3

* Refer to Section I of syllabus for more information.

Shasta College 1065 N. Old Oregon Trail Redding, CA 96001	No applicable courses offered 1979/80		
*Sierra College 5000 Rocklin Road Rocklin, CA 95677 Martin E. Jack, Jr. Dean of Instructional Services (916) 624-3333	Low Cost-Low Energy Housing	WOOD TECH 60	(X)
	Solar Energy Housing	WOOD TECH 61	(X)
	Passive Solar Design	DRAFT 99	(X)
College of the Siskiyous 800 College Avenue Weed, CA 96094 Bill Kinkade, Instructor (916) 938-4463	Solar Home	PHY SCI 10B	1
	Solar Collectors	PHY SCI 28A	(X)
	Alcohol Fuel Workshop	AG 409	(X)
	Basic Const. Tech.	VO ED 70	(X)
Skyline College 3300 College Drive San Bruno, CA 94066	No applicable courses offered 1979/80		
Solano Community College Suisun Valley Road Suisun City, CA 94585 Dr. C. Thomas Hosley Ass't. Supt., Vice President (707) 864-7000	Energy Conservation and Solar Design	DRAFT 40	2
Southwestern College 900 Otay Lakes Road Chula Vista, CA 92010	No applicable courses offered 1979/80		
Taft College 29 Emmons Park Drive Taft, CA 93268	No applicable courses offered 1979/80		
Ventura College 4667 Telegraph Road Ventura, CA 93003 C. Dahl (805) 642-3211	Energy Efficient Buildings & Solar	CON TECH 68	(X)

*Refer to Section I of syllabus for more information.

Victor Valley College 18422 Bear Valley Road Victorville, CA 92392 Charles A. Peterson Assoc. Dean of Inst./Occ. Ed. (714) 245-4271	Solar Water Heaters	ADULT ED	(X)
*Vista College 2020 Milvia St. #200 Berkeley, CA 94704 Michael B. Mills, Program Planner - Alt. Technology/ Env. Management (415) 841-8431	Alt. Energy Supplies	ENV STUD 48B	2
	Wind Energy System I	ENV STUD 48E	1
	Wind Energy System II	ENV STUD 48F	1
	Solar Energy I	ENV STUD 48G	1
	Solar Energy II	ENV STUD 48H	1
	Solar Energy III	ENV STUD 48I	1
	Solar Electronics	ENV STUD 48J	3
	House Tuning/Cutting Utility Costs	ENV STUD 48K	1
	Institutional Energy Auditing	ENV STUD 48L	1
	Use/Misuse of Env.	ENV STUD 48X	2
	Energy & the Way We Live	ENV STUD 48Y	2
	Solar Greenhouse Design & Management	ENV STUD 148D	1
	Solar Greenhouse Const.	ENV STUD 148E	1
	Shelter Design	ENV STUD 148F	2
West Hills College 300 Cherry Lane Coalinga, CA 93210	No applicable courses offered 1979/80		
West Los Angeles College 4800 Freshman Drive Culver City, CA 90230	No applicable courses offered 1979/80		
West Valley College 14000 Fruitvale Ave. Saratoga, CA 95070 Theordore Geredes Dean of Instruction (408) 867-2200	Energy Tech.	ENERGY 11	3
	Energy Audit Tech.	ENERGY 50	3
Yuba College 2088 N. Beale Road Marysville, CA 95901	No applicable courses offered 1979/80		

*Refer to Section I of syllabus for more information.

SECTION 3 COMMUNITY EDUCATION - SERVICES

WORKSHOPS, SEMINARS, OR FORUMS ON ENERGY Non-Credit

College Name	Community Education/Services Workshops, Seminars, or Forums on Energy (Non-Credit)
Antelope Valley College 3041 West Avenue K Lancaster, CA 93534 Jennings G. Brown Vice President of Academic Affairs (805) 943-3241	Energy Lecture/Forum Series Tech X 91 Energy Seminar I - Solar Water Heating for Consumers Energy Seminar II - Solar Pool Heating (Seminars on active space heating, passive space heating, energy auditing and weatherization planned for 1980-81)
Butte College Route 1, Box 183A Oroville, CA 95965 William Earle Director of Community Services (915) 895-2511	Energy Fair (covered all areas of energy)
Cabrillo College 6500 Soquel Drive Aptos, CA 95003 Liz Irwin Community Education Coordinator (405) 425-6000	Solar Energy Symposium
Canada College 4200 Farm Hill Blvd. Redwood City, CA 94061 Ruth Nagler Director of Extended Educational Programs (415) 364-1212	Workshop - "Cut Your Gas and Electric Bill Up to 50%"
Cerritos College 11110 East Alondra Blvd. Norwalk, CA 90650 C. Dean Paige Associate Dean Science, Engineering and Math Division (213) 860-2451	Energy Auditor Training Program (co-sponsored by the Chancellor's Office and the California Energy Commission)
Cerro Coso College Ridgecrest, CA 93555 Robert L. Takacs Campus Coordinator Solar Energy Technology Program (714) 375-5001	Have offered courses in past

Citrus College 18824 E. Foothill Blvd. Azusa, CA 91702 George Bratt (213) 335-0521, Ext 379	"The Community College Faculty Energy Seminar"
Columbia College P.O. Box 1849 Columbia, CA 95310 Jan Jorn Community Services (209) 532-3141	Domestic Hot Water Workshop (offered in past)
De Anza College 21250 Steven Creek Rd. Cupertino, CA 95014 Dr. Rowland K. Chase Director, Community Services (408) 996-4567	Workshop on Alcohol Production
Gavilan College 5055 Santa Teresa Blvd. Gilroy, CA 95020 Kenneth Cooper Director of Community Services (408) 847-1400	Solar Pool Heating--"Converting Your Pool to Solar"
Imperial Valley College P.O. Box 158 Imperial, CA 92251 Philip E. Champagne Alternate Energy Coordinator (714) 352-8320, Ext. 228	Do-It-Yourself Solar Energy Workshop Alcohol Fuel Production Seminar
Indian Valley College 1800 Ignacio Blvd. Novato, CA 94947 Lucien O'Keefe Energy Forum Coordinator (415) 883-2211	"Energy and the Way We Live' (Courses by Newspaper--national program) Energy Auditor Training Program (co-sponsored by the Chancellor's Office and the California Energy Commission)
Lake Tahoe Community College 2659 Lake Tahoe Blvd. So. Lake Tahoe, CA 95702 Carrie Campbell Price Consumer Education (916) 541-4660	"Passive Solar Design for Builders and Homeowners" "Retrofitting Your House for Passive Solar Design" "Energy Week" (May 1980 in conjunction with "Energy and the Way We Live")

Lassen College P.O. Box 3000 Susanville, CA 96130 Linda Kennedy Public Information Specialist (916) 257-6181	Department of Energy Solar Information Session Energy Fair
Los Angeles City College 855 North Vermont Ave. Los Angeles, CA 90029 Glenn D. James Math/Solar Instructor (213) 633-9141, Ext. 253	"Solar Collectors--Build Your Own"
Los Angeles Harbor College 1111 Figueroa Place Wilmington, CA 90744 Bill Stout Community Services (213) 518-1000	Solar Domestic Hot Water Workshop for Installers and Builders
Los Angeles Mission College 1101 San Fernando Road San Fernando, CA 91340 Community Services (213) 365-8271	Solar Collectors Workshop
Los Angeles Pierce College 6201 Winnetka Avenue Woodland Hills, CA 91371 Community Services (213) 347-0551	"Solar Energy - An Alternative Energy Source"
College of Marin Kentfield, CA 94904 Office of Instruction (415) 457-8811	"Solar Energy Utilization - Energy Efficient Design"
Merced College 3600 M Street Merced, CA 95340 Community Services (209) 732-4321	Workshop (one day) on "Energy and the Way We Live"
Merritt College 12500 Campus Drive Oakland, CA 94619 Suzanne Dye Business Officer (415) 531-4911, Ext. 211	"Energy and the Way We Live" (Courses by Newspaper - national program) Have done energy forums entitled: "$5.00 a Gallon or 5 Gallons Per Week" "Coal and Clean Air in California"

Mission College 3000 Mission College Blvd. Santa Clara, CA 95050 Community Services (408) 988-2200	Energy Auditor Training Program (co-sponsored by the Chancellor's Office and the California Energy Commission)
Modesto College College Avenue Modesto, CA 95350 Bill Wilson Coordinator, Sunrise Energy Center (209) 526-2000, Ext. 311	Sunrise Energy Center offers various community energy workshops
Monterey Peninsula College 980 Fremont Avenue Monterey, CA 93940 Dr. Philip Nash Dean of Instructional Planning (408) 646-4035	M.P.C. Energy Center offers energy hotline services and various community energy workshops (solar space, pool and domestic water heating, weatherization, greenhouse construction)
Mt. San Antonio College 1100 N. Grand Avenue Walnut, CA 91789 Community Services (714) 594-5611	"Energy Resources" (covering topics of solar conversion, wind energy, voltaic, geothermal, etc.)
Orange Coast College 2701 Fairview Road Costa Mesa, CA 92626 Community Services (714) 556-5651	Energy Auditor Training Program (co-sponsored by the Chancellor's Office and the California Energy Commission)
Pasadena City College 1570 Colorado Blvd. Pasadena, CA 91106 Vernon Spaulding Supervisor, Occ. Ed. (213) 578-7?01	"Solar Energy for the Consumer" (ENGR 4308) "Fundamentals of Energy Management" (ENGR 4312)
College of the Redwoods Eureka, CA 95501 Office of Instruction (707) 443-8411	"Energy--Your Choice Today"
San Bernardino Valley Coll. 701 S. Mt. Vernon Ave San Bernardino, CA 92403 Harry Smith Dean of Instruction (714) 888-6511	Energy Auditor Training Program (co-sponsored by the Chancellor's Office and the California Energy Commission)

San Diego Mesa College 7250 Mesa College Drive San Diego, CA 92111 Bob Gray, Director, Community Services (714) 279-2300	Energy Auditor Training Program (co-sponsored by the Chancellor's Office and the California Energy Commission)
San Jose City College 2100 Moorpark Avenue San Jose, CA 95128 Community Services (408) 298-2181	Energy Auditor Training Program (co-sponsored by the Chancellor's Office and the California Energy Commission)
Shasta College 1065 N. Old Oregon Trail Redding, CA 96001 Lloyd Livingston (916) 241-3523	Greenhouse workshop
Sierra College 5000 Rocklin Road Rocklin, CA 95677 Martin E. Jack, Jr. Dean of Instructional Serv. (916) 624-3333	Energy Auditor Training Program (co-sponsored by the Chancellor's Office and the California Energy Commission) "Basic Solar Power" (a six session community education short course)
College of the Siskiyous 800 College Avenue Weed, CA 96094 Dr. Gary Peterson Vice President, Instruction (916) 938-4463	Alcohol Fuel Workshop Series of four forums entitled: "Energy and the Humanities"
Southwestern College 900 Otay Lakes Road Chula Vista, CA 92010 Community Services (714) 421-6700, Ext. 259	Have offered community workshops on solar utilizing instructors from local solar company
Taft College 29 Emmons Park Drive Taft, CA 93268 Donald Zumbro Dean of Community Services (805) 765-4191	"Energy Week" was followed by a series of three Saturday forums Forum I: "Extracting oil from Diotomiteous Earth" Forum II: "Effects of the Petroleum Industry on the Westside of Kern County" Forum III: "Ethics of Energy: Dependence on Foreign Sources; Needs and Problems" "The Energy Dilema" (community service short course)

Ventura College 4667 Telegraph Road Ventura, CA 93003 Charles C. Dahl Instructor, Engineering (805) 642-3211	Energy Auditor Training Program (co-sponsored by the Chancellor's Office and the California Energy Commission) "Sun-Corp" workshops in which students fabricate solar panels for personal use
Victor Valley College 18422 Bear Valley Road Victorville, CA 92392 Dr. Alex Rudoff Community Services (714) 425-4271	Two or three workshops per semester on energy
West Hills College 300 Cherry Lane Coalinga, CA 93210 Ruthene Rouse (209) 935-0801	Various workshops have been done covering topics of greenhouses and hydroponics, alcohol production, energy alternatives
West Los Angeles College 4800 Freshman Drive Culver City, CA 90230 Marty Ross (213) 836-7110	Energy Auditor Training Program (co-sponsored by the Chancellor's Office and the California Energy Commission) "Energy Conservation for the Homeowner and Industry" (Community Services course)
Yuba College 2088 N. Beale Road Marysville, CA 95901 Wilson Dillard Public Information Officer (916) 742-7351	Workshops on solar design and renovating old homes for solar (workshops covered topics of domestic hot water, passive solar, weatherization) Two-part seminar on energy conservation will be offered in cooperation with P.G. & E. and local businesses during 1980-81

Colleges reporting no current activity in non-credit Energy Seminars/ Forums/Workshops

College of Alameda
Allan Hancock College
American River College
Bakersfield College
Barstow College
College of the Canyons
Chabot College, Hayward Campus
Chaffey College
Coastline Community College
Compton Community College
Contra Costa College
Cosumnes River College
Crafton Hills College
Cuesta College
Cuyamaca College
Cypress College
College of the Desert
Diablo Valley College
East Los Angeles College
El Camino College
Evergreen Valley College
Feather River College
Foothill College
Fresno City College
Fullerton College
Glendale College
Golden West College
Grossmont College
Hartnell College
Laney College
Long Beach City College
Los Angeles Southwest College
Los Angeles Trade Tech.
Los Angeles Valley College
Los Medanos College
Mendocino College
Mira Costa College
Moorpark College
Mt. San Jacinto College
Napa College
Ohlone College
Oxnard College
Palo Verde College
Palomar College
Porterville College
Reedley College
Rio Hondo College
Riverside City College
Sacramento City College
Saddleback College
San Diego City College
San Diego Miramar College
City College of San Francisco
San Joaquin Delta College
College of San Mateo
Santa Ana College
Santa Barbara City College
Santa Monica College
Santa Rosa Junior College
College of the Sequoias
Skyline College
Solano Community College
Vista College
West Valley College

SECTION 4 OTHER PROGRAMS OF NOTE

DE ANZA COLLEGE
21250 Stevens Creek Road
Cupertino, CA 95014

R. Kent
Dean of Science
(408) 996-4567

ENERGY COURSES

This solar energy program is aimed at two sections of the community. Through Industrial Technology 60A and 60B, the consumer, home owner, and general education student will become energy aware. Inservice training for engineers and technicians is provided through the night class offerings of Engineering 369, 379A, and 379B.

ENG 369 — Utilization of Solar Energy — 3 units

Principles of utilizing solar energy; application advantages and problems; its technology an economic potential for the near future. Three hours lecture.

ENG 379A — Design of Solar Energy Systems for Heating and Cooling — 2 units

Introduction to the use of solar energy for heating and air conditioning homes and buildings. Topics include an introduction to heat transfer, the availability of solar energy, the design of flat plate solar collectors, and energy loads on buildings. Two hours lecture.

ENG 379B — Design of Solar Energy Systems for Heating and Cooling — 2 units

Continuation of Engineering 379A. Topics include advanced solar collector designs, design of the storage system, the designs of a complete system for heating and a complete system for cooling, and the economics of design. Two hours lecture.

I TECH 60A — Solar Energy for the Consumer — 1 unit

Introduction to solar energy. Topics will include economic feasibility, home use to include pool heaters, hot water heaters, active and passive systems for space heating, and energy conservation. Subject will be covered on a descriptive, non-mathematical basis. 12 hours lecture.

I TECH 60B — Solar Energy for the Homeowner — 4.5 units

Background, economics, feasibility of solar energy as an alternative source of home energy for consumers. Pool heaters, hot water heaters, active and passive systems for space heating of homes. Energy conservation, heat pumps and other alternative sources will be considered. Retrofitting these devices to the home will be emphasized. Topics will be covered on a descriptive, non-mathematical basis. Fifty four hours lecture/demonstration.

MOUNT SAN ANTONIO COLLEGE
1100 N. Grand Avenue
Walnut, CA 91789

Irvin Colt
Admin. Dean, Occ. Programs
(714) 594-5611

ENERGY COURSES

Mount San Antonio College provides energy information to its general education students through its Physical Science 20, 22, 24, and 26 classes. In addition, vocational solar information is provided through Air Conditioning 70, 71, and 71L.

PHSC 20 — Energy-Options and Issues — 3 units

A study of energy: What it is, where it comes from, how we use it, general systems for energy conversion, and energy conservation. A major part of the course will be devoted to studying characteristics, advantages, and disadvantages of alternative energy sources. Three hours lecture.

PHSC 22 — Solar Energy — 1 unit

Study of the collection, storage, and use of solar energy, considering both domestic and commercial possibilities. Includes a field trip to a solar generating facility. One hour lecture.

PHSC 24 — Geothermal Energy — 1 unit

Study of geothermal energy: its source, availability, types of geothermal systems and their advantages and disadvantages. Includes a field trip to a geothermal field. One hour lecture.

PHSC 26 — Nuclear Energy — 1 unit

A study of nuclear energy (including fission and fusion), nuclear waste management, and the impact on society of a nuclear economy. Includes a field trip to a nuclear power plant. One hour lecture.

AIRC 70 — Solar and Alternate Energy Sources — 3 units

A study of energy sources including solar conversion to light and heat with an exploration of wind power, fuel cells, geothermal, and other potential alternate energy fields. Includes legislation pertaining to energy conservation. Three hours lecture.

AIRC 71 — Solar Energy Systems Installation — 3 units

Current solar energy systems with concentration on the conversion, installation, and maintenance of these systems, including insulation procedures, controls, and codes. Three hours lecture.

MOUNT SAN ANTONIO COLLEGE cont'd.

AIRC 71L — Solar Energy Systems Installation Laboratory — 1 unit

Laboratory experiments and experience in techniques of installing and maintaining solar conversion systems. Three hours laboratory.

MOUNT SAN JACINTO COLLEGE
21400 Highway 79
San Jacinto, CA 92383

Benton Caldwell
Dean of Vocational Instruction
(714) 654-7321

ENERGY COURSES

Mount San Jacinto College has been building solar energy technology classes into its vocational programs by offering Engineering 4, 6, and 7.

ENGR 4 — Solar Energy Applications — 3 units

A semi-technical course on the applications of solar energy, specifically in building houses to naturally accept solar energy as a free heating system, and in the design of solar collectors, such as flat plate collectors, pool heaters, parabolic reflectors, and trough-type collectors. The path of the sun, the heating requirements of homes, and the efficiency of various types of solar energy systems will be evaluated. Three hours lecture.

ENGR 6 — Solar Collector Design — 3 units

A technical course on the design of solar collectors including flat plate, air-type, hydronic, and focusing solar models.

ENGR 7 — Solar System Design — 3 units

A technical course that treats the subject of system design subjectively and mathematically. Includes study of collector, storage units, controls and distribution equipment and design of complete systems for residential and commercial use. Three hours lecture.

SUNRISE ENERGY CENTER
MODESTO JUNIOR COLLEGE
College Avenue
Modesto, CA 95350

Doug Beaman
Energy Center Manager
(209) 526-2000, ext. 311

The Sunrise Energy Center has been funded from December 31, 1979 to August 31, 1980, by a California Energy Commission contract. The Sunrise Energy Center, under this contract, is to develop, implement, and demonstrate a community energy information resource center to provide conservation/solar energy information to the general public in the greater Modesto area.

The Sunrise Energy Center is affiliated with Yosemite Community College District and located on the West Campus of Modesto Junior College. While the Center is part of Modesto Junior College and takes a leadership role in on-campus energy matters, its primary functions are <u>not</u> dependent upon any other on-campus programs.

COMMUNITY COLLEGE OF DENVER
Red Rocks Campus
12600 West 6 Avenue
Golden, Colorado 80401

Craig Hilton
Instructor, Plumbing/Solar Energy
(303) 988-6160

SOLAR ENERGY INSTALLATION & MAINTENANCE - CERTIFICATE AND ASSOCIATE DEGREE PROGRAM

The program is designed to provide the student with the knowledge and skills for job entry into the solar energy field, in the area of installation and maintenance, and to provide upgrading and refresher courses for people already employed in the field.

PASSIVE SOLAR ENERGY DRAFTING AND DESIGN - ASSOCIATE DEGREE PROGRAM

The program is designed to provide the student with the knowledge and skills for job entry into the solar energy field, in the area of passive drafting and design, and to provide upgrading and refresher courses for people already employed in the field.

CURRICULUM

Requirements for Associate Degree (Solar Energy Installation & Maintenance):

Course No.	Title	Cr. Hours
SOM 220	Basic Solar Systems	3
SOM 221	Solar Engineering Technology I	4
SOM 222	Solar Engineering Technology II	4
SOM 225	Solar System Design & Layout	3
SOM 226	Solar Panel Arrays	3
SOM 227	Testing & Evaluation of Solar Systems	3
SOM 228	Solar System Maintenance	3
SOM 229	Solar Panel Installations	3
SOM 235	Basic Solar Controls	3
SOM 236	Advanced Solar Systems & Controls	3
SOM 237	Passive Solar Systems	3
SOM 238	Alternative Backup Systems for Solar Energy	3
SOM 239	Introduction to Photovoltac & Wind Energy	3
PLU 100	Orientation of Tools, Basic Plumbing, and Drawings	3
PLU 107	Water Piping Methods	3
PLU 206	Hot Water Heating-Installation & Maintenance	3
BRI 120	Bricklaying For Construction Trades	3
BRI 125	Blueprint Reading For Construction Trades	3
CAR 120	Carpentry For Construction Trades	3
SHM 100	Basic Sheet Metal For Solar Energy	3
		63

Required Related Courses

Math Elective	3
English Elective	3
Social Science Elective	3
Electives	6
	15
TOTAL REQUIRED HOURS	78

Additional Major Courses

SOM 297	Cooperative Work	2-9
SOM 299	Independent Study	3

CORE ENERGY CLASSES (Solar Energy Installation & Maintenance)

SOM 220 Basic Solar Systems — 3 Cr. Hours

Different types of solar systems, collectors storage, and distribution. Solar heating, solar domestic hot water and solar air conditioning. Difference between air and liquid systems. 15 hours theory. 45 hours laboratory. 60 Ct. Hours

SOM 221 Solar Engineering Technology I — 4 Cr. Hours

The purpose of this course is to develop the capability of practitioners in the home building industry to size, install and operate solar heating and cooling systems for residential buildings. Also included is an overview of our energy problems today, a review of engineering math pertaining directly to this course, and basic physics. 45 hours theory/lecture - 23 hours laboratory 68 Ct. Hours

SOM 222 Solar Engineering Technology II — 4 Cr. Hours

This course is limited in scope to the design of solar heating and cooling systems for residential buildings, with primary emphasis on heating systems, although solar cooling systems are discussed, design and economic analysis of systems are the topics, and a review of engineering math related to this class. 45 hours theory/lecture - 23 hours laboratory 68 Ct. Hours

SOM 225 Solar System Design & Layout — 3 Cr. Hours

Keeping architectural and solar systems in harmony; adapting to existing structures, and when it is practical; types of collectors flat plate air, or liquid; omni directional tracting and tower reflection used in high temperature concentrating collectors. 15 hours theory - 45 hours laboratory 60 Ct. Hours

SOM 226 Solar Panel Arrays 3 Cr. Hours

Principles of operation and functional components, as in lumber and type required. Construction features of most air or liquid panels, and construction of a basic panel. 15 hours theory - 45 hours laboratory. 60 Ct. Hours

SOM 227 Testing & Evaluation Of Solar Systems 3 Cr. Hours

Cost, efficiency, and durability of panels, cost of backup systems and types of control and sensors used. 15 hours theory - 45 hours laboratory. 60 Ct. Hours

SOM 228 Solar System Maintenance 3 Cr. Hours

Repair of panels; checking for heat loss; where and how to correct condition of liquid evaluation equipment; maintenance of pumps, blowers, coils, and controls. 15 hours theory - 45 hours laboratory 60 Ct. Hours

SOM 229 Solar Panel Installations 3 Cr. Hours

Installing all types of panels on all types of roofs. 15 hours theory 45 hours laboratory 60 Ct. Hours

SOM 235 Basic Solar Controls 3 Cr. Hours

Theory of low and line voltage controls. Emphasis on schematic and layout techniques. Safety and basic electric components discussed. Trouble shooting solar control system and operational problem solving. 15 hours theory - 45 hours laboratory. 60 Ct. Hours

SOM 236 Advanced Solar Systems & Controls 3 Cr. Hours

This course will cover solar systems and controls of flat plate and concentrating collectors and solar systems, heat pumps, solar cooling and dehumidifying with emphasis on trouble shooting, and problems resolution using lab systems and simulators. 30 hours theory/lecture 30 hours laboratory 60 Ct. Hours

SOM 237 Passive Solar Systems 3 Cr. Hours

A study of the theory and use of passive solar energy. The design of the structure in harmony with passive systems experiment different storage methods, and cost analysis of passive systems versus other heating methods. 30 hours theory - 30 hours laboratory 60 Ct. Hours

SOM 238 Alternative Backup Systems for Solar Systems 3 Cr. Hours

Review of conventional and nonconventional sources of energy with applications. 30 hours theory - 30 hours laboratory. 60 Ct. Hours

SOM 239 Introduction to Photovoltac & Wind Energy 3 Cr. Hours

This course will explore the state-of-the-art hardware and its application for residential use. It will include discussion of the electrical circuits and components, power regulation and storage of electrical energy. 30 hours theory - 30 hours laboratory. 60 Ct. Hours

SOM 100 Sheet Metal for Solar Energy 3 Cr. Hours

Introduction to the Sheet Metal field, safety, basic equipment, and tools. Fabrication, techniques, and blueprint interpretation. 15 hours theory - 45 hours laboratory. 60 Ct. Hours

SOM 297 Cooperative Work Experience 2-9 Cr. Hours

A program of study developed with coordinated college course work and industry work experience. 15 hours theory - 45-360 hours laboratory. 60-376 Ct. Hours

SOM 299 Independent Study 3 Cr. Hours

Individual study on a special project which is related to the Diesel Program and outside the program offering. 90 hours laboratory 90 Ct. Hours

Requirements for Associate Degree (Passive Solar Energy Drafting & Design):

SOM 220	Basic Solar Systems	3
SOM 237	Passive Solar Systems	3
SOM 240	Advance Passive Solar Systems	3
SOM 245	Greenhouses	4
SOM 247	Site Built Solar Systems	3
SOM 248	Solar Greenhouse Construction	3
SOM 249	Earth Shelter Dwellings	4
SOM 260	Computer & Calculator Techniques for Solar Energy	2
BRI 125	Bricklaying for Solar Energy	3
BRI 126	Solar Walls & Fireplaces	3
DRI 105	Introduction to Drafting	6
DRI 115	Perspective Drawing	3
DRC 116	Introduction to Architectural Drafting-Frame Construction	6
DRC 200	Introduction to Commercial Architecture-Masonry Construction	6

COMMUNITY COLLEGE OF DENVER cont'd

DRI 206	Industrial Piping and Utility Consideration	3
DRS 210	Solar Drafting Technical Project	6
		61

Required Related Courses

Math Elective	3
English Elective	3
Social Science Elective	3
Electives	6
	15
	76

CORE ENERGY CLASSES (Passive Solar Energy Drafting & Design)

SOM 260 Computer & Calculator Techniques for Solar Energy 2 Cr. Hours

This course will familiarize the practitioner to the use of the TI-59 calculator for technical problem solving, algebraic entry procedure, chain calculations, keyboard functions, use of memory, programming techniques, and use of printer and magnetic card storage. 30 hours theory 30 Ct. Hours

BRI 125 Bricklaying for Solar Energy 3 Cr. Hours

Orientation to the field of bricklaying. General principles, initial techniques, and skill development and how bricklaying relates to the various aspects of solar energy. 15 hours theory - 45 hours laboratory. 60 Ct. Hours

BRI 126 Solar Walls & Fireplaces 3 Cr. Hours

Trombe wall and solid masonary construction; fireplace construction to include basic and special types with emphasis on heatilators and heat exchangers. 15 hours theory - 45 hours laboratory. 60 Ct. Hours

SOM 240 Advance Passive Solar Systems 3 Cr. Hours

Advance study of passive design in buildings. Advance calculation techniques. Material and cost efficiency analysis. 45 hours theory - 15 hours laboratory 60 Ct. Hours

SOM 245 Greenhouses 4 Cr. Hours

Various designs of greenhouses; parameters affecting heating and cooling loads of greenhouses; contribution of solar energy in winter heating of greenhouses and measures of maximizing this contribution; modifications in greenhouse design. 45 hours theory - 23 hours laboratory. 68 Ct. Hours

SOM 247 Site Built Solar Systems 3 Cr. Hours

Construction of site built collectors on roofs and walls integrated harmoniously with the building structure. To include liquid and air collectors, waterwalls and south wall glazing techniques applicable on both regular and modular construction. Codes, materials and cost efficiency analysis. 15 hours theory - 45 hours laboratory.
60 Ct. Hours

SOM 248 Solar Greenhouse Construction 3 Cr. Hours

Construction techniques and materials necessary for building a greenhouse; footing, stem walls and floors; structure and framing techniques; exterior paneling and glazing; insulating and ventilating techniques; codes. 15 hours theory - 45 hours laboratory.
60 Ct. Hours

SOM 249 Earth Shelter Dwellings 4 Cr. Hours

A state-of-the-art study to cover site planning; structural design; cold and warm climate designs; waterproofing and insulation; public policy issues and marketing techniques. 45 hours theory - 23 hours laboratory.
68 Ct. Hours

DRS 210 Solar Drafting Technical Project 6 Cr. Hours

A technical project in solar drafting skills by arrangement and permission of the instructor prior to registration. The project will consist of a written and approved proposal; scheduled progress reports and a finalized set of drawings. 120 hours laboratory.
120 Ct. Hours

NAVARRO COLLEGE
Corsicana, Texas 75110

Arthur C. Meyers
Director Solar Project
Solar Energy Division

ASSOCIATE DEGREE PROGRAM - SOLAR ENERGY TECHNICIAN

Navarro College, as Project Center, with four cooperating institutions (Brevard College in Cocoa Beach, Florida; Cerro Coso Community College in California; Malaspina College in British Columbia, and North Lake College in Dallas, Texas) has received funding from the National Science Foundation to design, develop, implement, test, evaluate and disseminate an associate degree curriculum to train solar energy technicians. This program, with Malaspina College funded by the Provincial Government of British Columbia, constitutes both a national and international effort to train viable and marketable solar energy technicians.

The SOLAR TECH Curriculum is modular in format. The program consists of both technical courses and courses which provide training and hands-on experience in the skills and tasks the Solar Energy Technician will be expected to perform. This parallel track modular development means that the materials can be used on many different levels and types of programs, from single introductory courses, modular topics or special short courses, through selected course sequences or for providing the basis for developing a Solar Energy Installation Certificate Program. All of these additional options and uses are above and beyond the basic demand for trained Solar Energy Science and Engineering Technicians.

CURRICULUM

Requirements for Associate Degree:

Math I	3
Energy Science I	4
Introduction to Solar Energy (Conservation & Passive Design)	4
Materials and Material Handling	3
Engineering Drawing	3
Education & Career Planning	1
Math II	3
Energy Science II	4
Collectors & Energy Stor[illegible]	4
Heat., Ventilation, & A.C[illegible]	4
English	4
Applied Elec. Circuits & Instru.	4
Sizing Design & Retrofit	4
Tech. Survey of Energy Sources	3
Introduction to Computers & Programming	3
Introduction to Business	3
Operational Diagnosis	3
Codes, Legal, Econ., Consumerism	2
General Psychology, Human Relations in Industry	3

NAVARRO COLLEGE cont'd.

Non-residential Applications & Future Technology	3
Technical Report Writing	2
Solar Practicum	3-5

CORE ENERGY CLASSES

Introduction to Solar Energy — 4 credits

A self-contained introduction to the general principles of solar energy and the concepts of specific types of solar energy systems. This course is designed for general information and background purposes.

Energy Science I and II — 4 credits

A two-semester course covering the basic scientific, engineering and physical principles governing the collection, conversion, storage, and utilization of solar energy. The content level matches that of a general physics and chemistry course and can be utilized as an energy/applied physics replacement at either the non-calculus or calculus level.

Technical Survey of Energy Sources — 3 credits

This course provides a flexible double semester format that allows instruction in either quantification of the introductory course or a complete passive solar energy heating and cooling course. Depending on interest and need, either option or a mixture of the two can be taught.

Non-Residential Applications and Future Technology — 3 credits

This course covers areas of solar energy outside the core area of the program and can be specialized to provide a secondary expertise for the technician. Current areas of emphasis are photovoltaic, biomass fuel production, and solar thermal control receivers. The content of this course depends on current demand and projected future growth.

Collectors and Energy Storage — 4 credits

This course considers the methods which are used to collect solar energy for use in simple heating and cooling applications. Various collector types are studied and the physics of their operation examined. The storage of energy in the form of heat, chemical reaction, and electrical production is presented and studied in detail. Extensive and detailed studies of the characteristics of passive systems and passive energy storage are also included in this course.

SCOTT COMMUNITY COLLEGE
Belmont Road
Bettendorf, Iowa 52722

Solar Energetics Technology Program
Trades, Industrial, and Technologies
Division.
(319) 359-7531

ASSOCIATE DEGREE PROGRAM IN SOLAR ENERGETICS TECHNOLOGY WITH AIR CONDITIONING AND REFRIGERATION OPTION

The purpose of this program is to prepare trainees for entry level employment in the Solar Technology Field. They may be employed as technicians in research laboratories; Solar energy systems installations; assistants to designers and architects; or other occupations related to the energy industry. Students will be prepared to perform installation and service functions to support architects and engineers designing and developing solar energy systems; maintenance of installed units; sizing, designing, and installing specific solar units with the proper storage. The student will be proficient in heating and air conditioning, sheet metal work, and all installation of all domestic and industrial units.

CURRICULUM

Requirements for Associate Degree:		Credit Hours
82-001	Basic Refrigeration Fundamentals	6
82-002	Basic Electrical Fundamentals	6
50-016	General Mathematics I	3
11-005	Communication Skills I	3
82-003	Soldering & Brazing	2
82-102	Electrical Controls & Circuitry	6
82-101	Refrigeration Components	4
50-017	General Mathematics II	3
82-004	Fundamentals of Air Flow	5
82-103	Domestic Heating & Air Conditioning	6
82-014	Blue Print Reading	3
82-005	Commercial Refrigeration Principles	6
82-006	Sheetmetal Fundamentals	3
50-118	Applied Mathematics II	4
82-007	Introduction to Solar Heating & Cooling	3
82-008	Commercial Refrigeration Systems	6
63-003	Physics I (heat and insulation)	4
75-011	Human Relations	3
50-119	Technical Mathematics	4
83-002	Engineering Drafting I	4
04-016	Computer Programming	3
63-103	Physics II (Statics & Fluids)	4
82-104	Industrial Electronics	3
50-120	Technical Mathematics II	4
82-009	Solar System Analysis	6
63-203	Physics III (Optics)	3
82-010	Microprocessor Control Fundamentals	6
70-020	Energy Economics	6
82-011	Graphics	6
82-012	Design Project - Phase A	5

82-112	Design Project - Phase B	6
12-101	Communication Skills II	3
82-013	Related Solar Concepts	5
00-024	Business Organizations & Management	4

Requirements for Air Conditioning & Refrigeration Option:

After the first two quarters of the above program, a person may elect to go through a year option program in air conditioning and refrigeration repair. This option will lead to a diploma upon completion. After the first two quarters of the above program, the student will take the following two quarters:

82-103	Domestic Heating & Air Conditioning	6
82-020	Laundry & Kitchen Components I	6
82-005	Commercial Refrigeration Principles	6
00-024	Business Organization & Management	4
75-011	Human Relations	3
82-008	Commercial Refrigeration Systems	6
82-120	Laundry & Kitchen Components II	4
82-021	Refrigeration System Diagnosing	3

CORE ENERGY CLASSES

82-007 Introduction to Solar Heating & Cooling 3 Cr. Hours

Introduction to the fundamental concepts of solar space heating and cooling, domestic water heating, and solar-generated electricity. Centralized and decentralized solar utilization is discussed, and solar thermal aspects of space conditioning are reviewed.

82-009 Solar System Analysis 6 Cr. Hours

The theory and practical aspects of complete solar system installations will be studied in regard to the operation and efficiency. Different types of solar heat collection and storage will be studied and the students will gain first hand experience with these in the lab.

Design Project

A two quarter course in two phases

82-012 Phase A 5 Cr. Hours
82-112 Phase B 6 Cr. Hours

The two phases must be taken in two successive quarters. Each student will select and define the objectives for an alternate energy system. Students will draw upon all of their previous course knowledge to complete these design projects.

SCOTT COMMUNITY COLLEGE cont'd

63-003 Physics I (Heat & Insulation) 4 Cr. Hours

Covers the basic principles of heat, and heat transfer. Studies will include both materials for good heat transfer and materials for the prevention of heat transfer.

63-203 Physics III (Optics) 3 Cr. Hours

Basic principles of solar heat collection. He/she will be introduced to solar availability; solar radiation measurement; refraction-reflection-transmissivity; collector covers; absorber plates; selective surface coatings. Students will learn to set up and monitor solar radiation readings and to record, diffuse, and direct solar radiation.

70-020 Energy Economics 6 Cr. Hours

A study of the economic value of various forms of energy with the main emphasis being on solar energy. Methods of estimating initial installation and operations cost will be covered with analysis of savings compared to conventional forms included.

Community Resource Project
3317 S Street
Sacramento, CA 95816

Maria Castro, Administrator

Louis Viega, Intake Emergency Service-worker
(916) 739-0886

TYPE OF PROGRAM: Solar Technician Training

NUMBER OF STUDENTS: 10

DATES OF OPERATION: Program initiated 1978

SOURCE OF FUNDS: CETA

PROGRAM DESCRIPTION: Nine month training program includes three months of OJT. The six months of "in-house" training is focused on passive space heating and active hot water systems, with approximately 50% devoted to classroom and 50% to hands-on training. Two classes have graduated since program began.

Job Corp of San Diego
1325 Iris Ave.
Imperial Beach, CA 92032

Tom Guerin
Randy Mann
Rick Brooke
(714) 423-6872

TYPE OF PROGRAM:	Solar Energy Installer Training
NUMBER OF STUDENTS:	25 - 30
DATES OF OPERATION:	Program initiated January 1980
SOURCE OF FUNDS:	Job Corp

PROGRAM DESCRIPTION: Training program is self-paced. Phase I involves academic instruction and has a remedial reading and math component; Phase II is work experience in solar system installation. It is a vocational training program in installation of solar hardware, primarily hot water heating systems.

Net Energy
854 9th St.
Arcata, CA 95521

Kit Mann
(707) 822-5926

TYPE OF PROGRAM:	Solar Technician Training
NUMBER OF STUDENTS:	16
DATES OF OPERATION:	March 1979 - December 1979
SOURCE OF FUNDS:	CETA; Department of Energy; Department of Labor

PROGRAM DESCRIPTION

Nine month training program with three months of classroom training and six months of hands-on experience. Most subjects were taught in-house by staff and/or local tradespersons, but students spent two days/week taking courses at College of the Redwoods during the first three months of training. Training focused on design, construction, and installation of: (1) active and passive hot water systems; (2) attached greenhouses. Installations were made on low-income housing. Net Energy currently operates a weatherization project that includes some solar instruction.

Proteus Adult Training
319 N. Harris
Hanford, CA 93230

Dave Timson
Solar Instructor
(209) 584-7518

TYPE OF PROGRAM: Solar Installer Training

NUMBER OF STUDENTS: 15

DATES OF OPERATION: Program initiated February 1978

SOURCE OF FUNDS: CETA

PROGRAM DESCRIPTION: Five month training program focuses upon domestic hot water system construction and installation. Classes are run on an overlapping schedule with four persons rotated in each month as four others graduate. Six training classes have graduated since program began in 1978.

San Mateo Economic Opportunity Commission
2434 Garvey
Redwood City, CA 94061

Bill Thane
(415) 364-8181

TYPE OF PROGRAM:	Solar Mechanic Training
NUMBER OF STUDENTS:	10
DATES OF OPERATION:	October 1978 - October 1979
SOURCE OF FUNDS:	CETA; Department of Energy; Community Services Administration; National Center for Appropriate Technology
PROGRAM DESCRIPTION:	One year training program taught basic skills for solar installers (i.e., plumbing, electrical, carpentry, etc.). Hands-on accounted for approximately 60% of training and was done at a house that was renovated by trainees. Classroom instruction was approximately 40%, much of which was given by Canada College. Local contractors were brought in from time to time to assist with particular topics.

Sierra Committee Solar Project
7993 Rock Springs Road
Penryn, CA 95663

Carl Young, Director
(916) 663-3192

Kirk Lindgren, Solar Instructor
(916) 823-0963

TYPE OF PROGRAM:	Solar Installer Training
NUMBER OF STUDENTS:	11
DATES OF OPERATION:	Program initiated 5/79
SOURCE OF FUNDS:	CETA
PROGRAM DESCRIPTION:	15 week course for solar mechanics includes ten weeks of classroom instruction and five weeks of hands-on experience. Training focused on active hot water systems and passive space heating. 25 persons have completed two previous training cycles.

Skyray Systems
390 Ocie Way
Hayward, CA 94541

Gil Hyder
(415) 881-6961

TYPE OR PROGRAM:	Solar Installer Training
NUMBER OF STUDENTS:	Average of 14 per class
DATES OF OPERATION:	Program initiated September 1978
SOURCE OF FUNDS:	CETA

PROGRAM DESCRIPTION: Skyray programs are located in Hayward, Belmont, and Sacramento. Training curriculum, focused upon hot water heating systems, includes instruction on safety and basic job motivation as well as construction techniques, blueprint reading, solar theory, and plumbing.

Westside San Bernardino Community
Development Corporation
1208 West Highland Avenue
San Bernardino, CA 92411

Duane Burgess
Special Assistant, Energy
(714) 887-2546

TYPE OF PROGRAM:	Solar Installer Training
NUMBER OF STUDENTS:	24 - 35
DATES OF OPERATION:	Program initiated 1977
SOURCE OF FUNDS:	CETA, other state and federal grants

PROGRAM DESCRIPTION: The solar installer course lasts approximately six months and is lecture/hands-on training with courses in blueprint reading, math, photovoltaic conversions, etc.

Youth Community Enterprises

Home: 8480-22 Via Sonoma
La Jolla, CA 92037

Jerry Hull
Program Manager
Home: (714) 453-2556

TYPE OF PROGRAM: Solar Mechanic Training

NUMBER OF STUDENTS: 8

DATES OF OPERATION: October 1978 - September 1980

SOURCE OF FUNDS: YCCIP; CETA Title VI; Southwest Region Border Commission

PROGRAM DESCRIPTION: Originally designed as a five month training program for 15 participants, the program was changed to a 10 month cycle. Eight persons will have completed this 10 month training cycle when the program ends September 30, 1980.

Training is 40 hours/week, 15 hours/week classroom and 25 hours/week practicum. The practicum included installing domestic hot water systems in low-income housing.

ALCOHOL FUEL PRODUCTION: CURRICULUM/INFORMATION

Colby Community College
1255 South Range
Colby, Kansas 67701
(913) 462-3984

Colby Community College has developed A Learning Guide for Alcohol Fuel Production. The Guide has been used in the college's sequence of one-week workshops over the past year, but it is now used as a resource for the newly instituted Alcohol Fuels Technology AA degree program.

Energy Incorporated
P.O. Box 736
Idaho Falls, Idaho 83401

Energy Incorporated has recently produced a curriculum guide entitled: Alcohol Fuels: Use, Principles, and Economics. Steven J. Winston, the principal writer, has also sketched out a fullfledged Associate Degree program that might be organized with the text as a base.

National Alcohol Fuels Producers Association
P.O. Box 2756
Lincoln, Nebraska 68502
(402) 423-7830

or

NAFPA/WASHINGTON
1760 Reston Avenue, Suite 102
Reston, Virginia 22090
(703) 471-1611

NAFPA publishes a monthly newsletter, "Earth & Energy", and a monthly technical bulletin. NAFPA has helped Colby Community College and other colleges in designing curriculum and locating instructors and speakers for workshops and training programs. The association maintains an active file of people in the alcohol fuels business--manufacturers, suppliers, consultants.

National Center for Appropriate Technology
P.O. Box 3838
Butte, Montana 59701
(406) 494-4572

Ken Runnion of the Alcohol Fuels Division of NCAT is doing Research and Development (R & D) on Alcohol Fuels Production, which is tied in with plans for demonstration projects.

Aside from the R & D of the Agriculture and Biofuels Task group, NCAT has a Building Technology Task Group which focuses its work on energy conservation and weatherization; building rehabilitation; design and construction techniques of low-cost housing for energy efficiency. The Renewable Energy Task Group is the third branch of NCAT's R & D Division, and its work focuses on the development and evaluation of various low-cost renewable energy appliances with particular emphasis on retrofit applications to existing homes and apartments.

NCAT's Information Division maintains a library and resource center and responds to informational requests. In addition, NCAT publishes a wide range of information materials on Appropriate Technology for which an order form and price list can be obtained by writing the Information Division at the above address.

Office of Alcohol Fuels
Department of Energy
Forrestal Building 2A611
Washington, D.C. 20585

Bill Holmberg is the Acting Director, Office of Alcohol Fuels, at DOE and his office should be able to provide referral to other information sources.

Solar Energy Research Institute
Alcohol Fuels Hotline
1536 Cole Boulevard
Golden, Colorado 80401
(800) 525-5555

SERI offers Hotline Services and information packets in response to inquiries about Alcohol Fuels production.

SERI also maintains the Solar Energy Information Data Bank (SEIDB) for the Federal Government with files on: Solar Energy Manufacturers; Solar Energy Education; Solar Insolation; Solar Installations; Solar Law and Legislation; Computer Models and Simulations; International Projects; International contacts; Solar Energy Professionals; Solar Energy Products; Solar Bibliography.

Information about the use of the SEIDB, about SERI Publications, or specific inquiries about solar technologies can be directed to the National Solar Inquiry and Referral Service that is maintained by SERI (800) 525-5000.

Consumer and Homemaking Education
Inservice Project
333 Main Street
Redwood City, CA 94063

Phyllis A. Marcus, Director
(415) 364-5600, Ext. 2560

PROGRAM DESCRIPTION:

Resource material for Home Economics teachers interested in incorporating energy and environmental issues into their curriculum, are available from the CHE Inservice Office. Topic areas include: Energy Choices and Environmental Problems; Energy Conservation in the Home; Chemicals and the Food Cycle; and Pollution Problems: air, chemical, noise, pesticide, toxic substances and water. The CHE Inservice Project sponsored two regional workshops on "Resource Management Through Energy Conservation" last spring and hopes to offer additional workshops in 1980-81.

CHE Inservice Education is a VEA Subpart V Statewide Inservice Project in cooperation with the San Mateo County Office of Education.

California Energy Extension Service
1211 16th Street
Sacramento, CA 95814

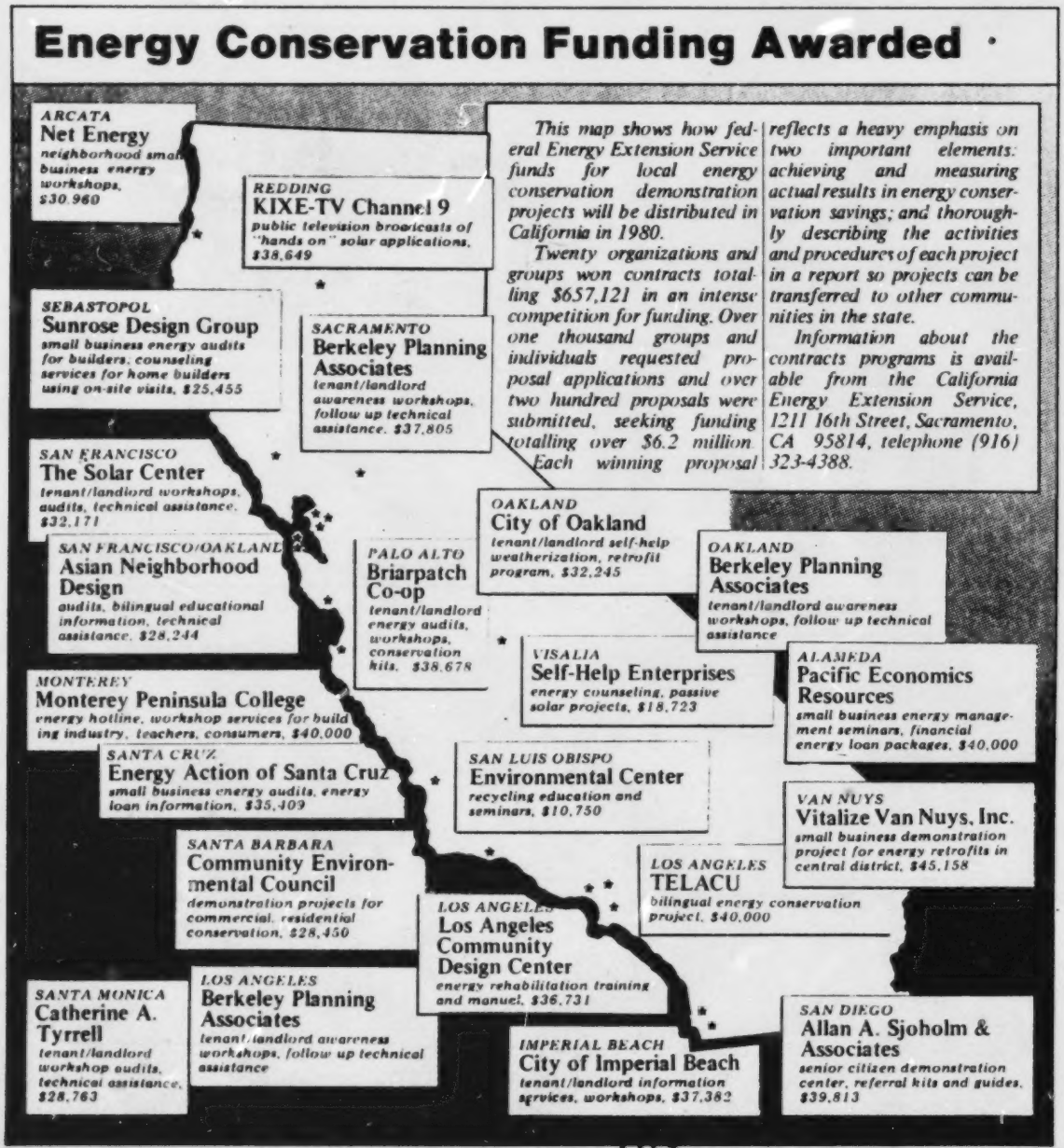
Dennis Sykes
Director, CEES
(916) 323-4388

PROGRAM DESCRIPTION:

Congress passed the National Energy Extension Service Act in 1977 to help states establish energy information programs that would do for energy what the Cooperative Extension Service has done for agriculture: provide individuals with advice, training, and technical assistance. In this case, the focus is on conserving energy and reducing costs while converting to renewable sources of energy. The program is aimed at small businesses, farms, individuals, and local governments.

OAT is the lead agency for the California Energy Extension Service, with CEES managing the grants program in addition to providing other services.

Energy Conservation Funding Awarded


ARCATA
Net Energy
neighborhood small business energy workshops, $30,960
REDDING
KIXE-TV Channel 9
public television broadcasts of "hands on" solar applications, $38,649
SEBASTOPOL
Sunrose Design Group
small business energy audits for builders; counseling services for home builders using on-site visits, $25,455
SACRAMENTO
Berkeley Planning Associates
tenant/landlord awareness workshops, follow up technical assistance, $37,805
SAN FRANCISCO
The Solar Center
tenant/landlord workshops, audits, technical assistance, $32,171
SAN FRANCISCO/OAKLAND
Asian Neighborhood Design
audits, bilingual educational information, technical assistance, $28,244
PALO ALTO
Briarpatch Co-op
tenant/landlord energy audits, workshops, conservation kits, $38,678
OAKLAND
City of Oakland
tenant/landlord self-help weatherization, retrofit program, $32,245
OAKLAND
Berkeley Planning Associates
tenant/landlord awareness workshops, follow up technical assistance
VISALIA
Self-Help Enterprises
energy counseling, passive solar projects, $18,723
ALAMEDA
Pacific Economics Resources
small business energy management seminars, financial energy loan packages, $40,000
MONTEREY
Monterey Peninsula College
energy hotline, workshop services for building industry, teachers, consumers, $40,000
SANTA CRUZ
Energy Action of Santa Cruz
small business energy audits, energy loan information, $35,409
SAN LUIS OBISPO
Environmental Center
recycling education and seminars, $10,750
VAN NUYS
Vitalize Van Nuys, Inc.
small business demonstration project for energy retrofits in central district, $45,158
SANTA BARBARA
Community Environmental Council
demonstration projects for commercial, residential conservation, $28,450
LOS ANGELES
TELACU
bilingual energy conservation project, $40,000
LOS ANGELES
Los Angeles Community Design Center
energy rehabilitation training and manuel, $36,731
SANTA MONICA
Catherine A. Tyrrell
tenant/landlord workshop audits, technical assistance, $28,763
LOS ANGELES
Berkeley Planning Associates
tenant/landlord awareness workshops, follow up technical assistance
IMPERIAL BEACH
City of Imperial Beach
tenant/landlord information services, workshops, $37,362
SAN DIEGO
Allan A. Sjoholm & Associates
senior citizen demonstration center, referral kits and guides, $39,813

This map shows how federal Energy Extension Service funds for local energy conservation demonstration projects will be distributed in California in 1980.

Twenty organizations and groups won contracts totalling $657,121 in an intense competition for funding. Over one thousand groups and individuals requested proposal applications and over two hundred proposals were submitted, seeking funding totalling over $6.2 million. Each winning proposal reflects a heavy emphasis on two important elements: achieving and measuring actual results in energy conservation savings; and thoroughly describing the activities and procedures of each project in a report so projects can be transferred to other communities in the state.

Information about the contracts programs is available from the California Energy Extension Service, 1211 16th Street, Sacramento, CA 95814, telephone (916) 323-4388.

Community Contractors

Briarpatch Cooperative Market

1830 Cowper Street, Palo Alto, CA 94301. Contact Karl Johnson (415) 326-4286. $38,678

The **Practical Applications for Teaching Conservation in the Household (PATCH) Program** has devised a program to reach renters who shop at the Briarpatch Food Co-op and receive the bi-weekly newsletter. Workshops will teach members who live in rental housing how to perform their own energy audits emphasizing little or no cost measures. A unique aspect of this project is a kit of conservation devices renters can take with them when they move (lowflo shower heads, light dimmers, water heater insulation blankets and more). Displays and handouts will highlight water conservation, weatherstripping, insulation, and solar projects.

City of Oakland, Social Services Department

659-14th Street, Oakland, CA 94612. Contact Ronita Hunter (415) 273-3434/ 273-3121. $32,425

The **Rentro-fit** conservation program will operate a self-help weatherization and retrofitting program that will be directed at low-income renters in the West Oakland Community Action Agency Planning District. By providing technical assistance through workshops, project Rentrofit seeks to encourage low-income renters of West Oakland to perform minor home repairs and weatherization on their rental units.

Pacific Economic Resources League, Inc.

1221 Broadway, Suite 310, Oakland, CA 94612. Contact James B. Brewer (415) 454-8880. $40,000

Project Sesame will focus energy outreach activities at small businesses in Alameda and Contra Costa Counties. Included in their project are plans to conduct 120 energy audits for small businesses in this region. Project Sesame will also conduct nine seminars in energy management, and provide financial consultation for energy loan programs for small businesses.

Self-Help Enterprises

220 South Bridge Street, Visalia, CA 93279. Contact Paul Boyer (209) 733-9091. $18,733

The **Teviston Solar Project** will provide energy conservation counseling and consumption surveys for 100 houses. The project will use the skill and labor of local residents to construct and install 25 passive solar water heating systems.

Monterey Peninsula College District

980 Fremont Street, Monterey, CA 93940. Contact Dr. Philip Nash (408) 649-1150 Ext. 338. $40,000

The **Project for Industry, Education and Consumer Conservation of Energy (PIECCE)** targets three groups: building industry, teachers and consumers. The approach combines hotline services with a series of workshops on energy sources, utilization and conservation. The building industry workshops highlight solar design and construction techniques using recognized experts. The teachers, K-14 of the County of Monterey will participate in a workshop and provide in-service training at their respective schools. Emphasis will be on social science and home economics courses and the provision of a 2-week learning package. A hotline will provide specific curriculum and teaching aid information.

Energy Action of Santa Cruz County

Post Office Box 1380, Santa Cruz, CA 95061. Contact John Cohn (408) 462-3300. $35,409

This **Energy Efficient Business Project** will provide outreach, education and technical assistance for small businesses in Santa Cruz county. A manual on energy audits and conservation will be developed to provide not only practical information, but a referral for services of the program and advertise workshops for small businesses. The Santa Cruz Community Credit Union will provide life cycle energy cost analysis and technical evaluation of equipment purchases through their technical and financial services program. They will combine with this program an energy loan service geared to the commercial sector. The program will culminate with "Conservation Week" featuring successful energy conserving businesses and renters, an auction of energy conservation devices and other activities.

Environmental Center of San Luis Obispo County (ECOSLO)

985 Palm Street, San Luis Obispo, CA 93401. Contact Steven See (805) 544-1777. $10,750

The **Energy Conservation Through Resource Recovery** project will use slide show presentations to service groups, schools and clubs, to highlight the energy savings aspects of recycling. A special seminar series for the teachers of the county will be held to instruct teachers from primary to college levels on recycling options.

COMMUNITY CONTRACTORS:

Net Energy

854 Ninth Street, Arcata, CA 95521. Contact Suzanne Guerra (707) 822-5926. $30,960

The **Residential/Small Business Energy Conservation Program** will provide residents of Humboldt County with a variety of energy conservation information services through a combination of workshops and neighborhood energy presentations. Fifteen pre-targeted neighborhoods, including three mobile home parks, will be provided with energy conservation presentations tailored to their needs. The program will also focus on consumer education and management for small business.

Everything New Under The Sun

KIXE-TV Channel 9 (PBS), 825 Industrial, Redding, CA 96099. Contact Lauray Yule or Sandy McCaleb (916) 241-7900. $38,649

Public Television Station KIXE in cooperation with California State University, Chico, Butte College, and the Butte County Community Action Agency proposes to increase the use of solar energy in Northeastern California. A series of six half-hour programs on solar energy will be produced for public television broadcast to rural residents of Northeastern California during the fall of 1980. Classes emphasizing "hands on" experience in the construction of solar water heating systems and solar greenhouses will be offered in local community colleges in conjunction with the television broadcasts.

Sunrose Design Group

Box 26-7202 Bodega Avenue, Sebastopol, CA 95472. Contact Paul Larkin (707) 823-0474. $25,455

The **North Coast Builders Exchange Energy Audit Program** will serve the construction industry in six counties: Sonoma, Mendocino, Lake, Marin, Humboldt and Del Norte by providing energy audits, on-site visits and counseling services. Results of audits will be highlighted for the members of this organization, the largest builders exchange in California, through their weekly paper.

Berkeley Planning Associates (BPA); California Housing Action and Information Network (CHAIN)

1912 Bonita Avenue, Berkeley, CA 94704. Contact (BPA) Douglas Fielding (415) 549-3492/(CHAIN) Steve Hopcraft (916) 448-2544. $37,805

The **Energy Efficiency for Multi-Family Tenants Program** will conduct energy conservation awareness and training workshops and follow-up energy saver action activities that offer technical assistance and materials for energy saving maintenance improvements. This project will use low/no cost conservation equipment. Two low/moderate income rental complexes *in each of* the cities of Oakland, Sacramento, and Los Angeles have been targeted for presentations. Low-income and moderate income rental complexes will be selected in each of these cities for demonstration.

Asian Neighborhood Design, Inc.

576 Vallejo Street, San Francisco, CA 94133. Contact Gilbert Chan (415) 982-2756. $28,244

The **Chinatown Energy Conservation Project, Phase 3,** will provide bilingual energy conservation education, information and technical assistance to Chinese speaking residents, renters and small businesses in San Francisco, Oakland and other East Bay neighborhoods. Energy conservation literature will be translated into Chinese; workshops and audits will be conducted; a hotline will answer questions and weatherization materials will be provided for do-it-yourself conservation efforts.

The Solar Center

62 Townsend Street, San Francisco, CA 94107. Contact Peter Barnes (415) 957-9660. $32,171

The **Multi-Unit Energy Efficiency Project** will provide technical and economic energy conservation information to apartment owners and managers in the North Bay area. Information will be delivered in a workshop format, followed by individualized audits.

Left: Diana Fett, vice-president of the Solar Center, surveys solar water heating system installed in 50-unit apartment building in Oakland.

COMMUNITY CONTRACTORS:

Community Environmental Council
924 Anacapa Street, Suite B4, Santa Barbara, CA 93101. Contact Paul Relis (805) 965-8302. $28,450

The **Santa Barbara Energy Extension Service** will develop energy conservation demonstration projects involving commercial offices, the rental housing market, Santa Barbara's motel industry, and the general residential market. Workshop sessions will focus on weatherization, efficient load management, and new energy conservation activities.

Vitalize Van Nuys, Inc.
14545 Victory Boulevard, Van Nuys, CA 91411. Contact Marcia Mednick (213) 989-4377. $40,000

The **Business Community Energy Conservation Program** will serve as a demonstration project for revitalization and rehabilitation programs in the central business district of Van Nuys. The program will alert a large part of the San Fernando Valley business community to suitable energy conservation measures through a program of public awareness including "shopping lists" of applicable measures, audits, workshops on implementation and a follow-up monitoring of energy consumption.

Santa Monica Energy Project
1319 14th Street, Apt. C, Santa Monica, CA 90404. Contact Catherine A. Tyrrell (213) 393-7353. $27,762

The **Santa Monica Energy Project** will provide energy workshops, energy audits and technical assistance aimed specifically at tenants and landlords. The project will promote cooperation between tenants and landlords.

Los Angeles Community Design Center
541 S. Spring Street #800, Los Angeles, CA 90013. Contact Gary Squier (213) 626-1453. $36,731

The **Energy Efficient Housing Rehabilitation Training Pilot: Harvard Park Community Revitalization Program** will develop specific design, financing and counseling packages to make energy conservation and solar water heating options a reality for the clients in Harvard Park as they rehabilitate their homes. The Los Angeles Community Design Center will develop a manual introducing housing rehabilitation specialists to energy efficient design and building specifications. The analysis will focus on retrofit opportunities in low and moderate income housing. Workshops will instruct specialists in the use of the manual. Homeowner brochures will be provided for clients with less technical information concerning energy and money saving possibilities.

TELACU
615 So. Atlantic Boulevard, East Los Angeles, CA 90022. Contact David Lizarraga (213) 263-3809. $40,000

The **TELACU Bilingual Energy Conservation Project** is designed to improve the quality of life of the Mexican-American Community in Los Angeles. Personalized programs will reach this neglected population through hands-on solar workshops, solar greenhouse construction, a bilingual consumer conservation information center, media presentations and residential audits.

Allan Sjoholm & Associates
6893 Summit Ridge Way, San Diego, CA 92120. Contact Allan Sjoholm (714) 287-8585. $39,813

The **Energy Conservation Program for Seniors** will directly affect a specific category of low-income energy users desperately in need of assistance. This energy information and training outreach program will use seniors themselves as change agents to influence their peers to adopt energy conservation measures. It will develop new and improved ways of communicating energy information through hands-on training sessions, walk-through life-size exhibits, and step-by-step large print illustrated guides to residential energy conservation techniques.

City of Imperial Beach
825 Imperial Beach Boulevard, Imperial Beach, CA 92032. Contact Howard Hicks (714) 423-8300 Ext. 22. $37,382

The **Landlord/Tenant Partnership** program from the City of Imperial Beach addresses the concerns and interests of tenants and landlords through the promotion of energy conservation devices suitable for renters and energy information materials specifically tailored for landlords. A series of workshops bringing together the two interest groups will be held to demonstrate devices and techniques that can be used in rental dwellings. □

106

SECTION 5 INFORMATION SOURCES

The following list contains information sources that might prove helpful in answering energy-related questions. Those that are preceded by an asterisk (*) are offices consulted under this grant.

CALIFORNIA AGENCIES, ASSOCIATIONS, AND SOCIETIES

*Alternative Consumer Energy Society
c/o Public Education Services
Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, CA 91103
(213) 254-2402

Alternative Energy Co-Operative
(Berkeley)
2600 Dwight Way, Room 204
Berkeley, CA 94702 (415) 849-3816
(Santa Cruz)
1200 River Street
Santa Cruz, CA 95060
(408) 426-1299

*California Energy Commission
1111 Howe Avenue
Sacramento, CA 95825

Public Information	(800) 852-7516
Solar Office (General & Program Information	(916) 920-6019
Conservation	(916) 920-6091
Building & Appliance Standards	(916) 920-6006
Transportation	(916) 920-6106

*California Energy Extension Service
1211 16th Street
Sacramento, CA 95814
(916) 323-4388

California Public Utilities Commission
350 McAlister
San Francisco, CA 94102
(415) 557-2527

Cal SEIA
2555 Clovis Avenue
Clovis, CA 93612
(209) 299-9741

Center for Solar Energy Application
San Jose State University
San Jose, CA 95192
(408) 277-2939

*Consumer Homemaking Education Inservice Project
333 Main Street
Redwood City, CA 94063
(415) 364-5600, Ext. 2567

*Contractor's State Licensing Board
1020 N Street, Room 579
Sacramento, CA 95814
(916) 445-7500

*Department of Consumer Affairs
1020 N Street
Sacramento, CA 95814
(800) 952-5567

Energy Conservation Center
(P.G.& E., SMUD, SCE)
77 Beale Street
San Francisco, CA 94106
(800) 792-8000
from San Luis Obispo (415) 543-2073
(call collect)

Energy Research Group
Ecology Action Institute
1000 N. Ninth Street
Modesto, CA 95350
(209) 838-7073

Franchise Tax Board
Energy Resource Conservation & Development Commission
1111 Howe Avenue, Room 424
Sacramento, CA 95825
(800) 952-5670

CALIFORNIA AGENCIES, cont'd.

Habitat Center
P.O. Box 2363
Berkeley, CA 94702
(415) 526-0869

Northern California Solar Energy Assoc.
P.O. Box 1056
Mountain View, CA 94042

*Office of Appropriate Technology (OAT)
1530 Tenth Street
Sacramento, CA 95814
(916) 445-1803

*Solar Business Office
1120 N Street, 2nd Floor
Sacramento, CA 95814
(916) 445-0970

SolarCal Office
1111 Howe Avenue, Suite 315
Sacramento, CA 95825
(916) 920-7621
(800) 952-5670 Solar Information

Solar Energy Advocates
P.O. Box 876
Sacramento, CA 95814
(916) 446-2012

Solar Energy Society of America
2780 Sepulveda Blvd.
Torrance, CA 90515

Solar Utilization Now for Resources
and Employment (SUNRAE)
P.O. Box 915
Goleta, CA 93017
Sacramento # (916) 448-1198

Southern California Solar Energy Assoc.
City Administration Building 11-B
202 C Street
San Diego, CA 92101
(714) 236-0432

U.C. Energy Extension
University of California, Davis
Davis, CA 95616
(916) 752-0858

NATIONAL AGENCIES, ASSOCIATIONS, AND SOCIETIES

American Society of Heating,
Refrigeration and Air Conditioning
Engineers (ASHRAE)
Research and Technical Services
345 East 47th Street
New York, NY 10017
(212) 644-7931

Center for Energy & Environmental
Management
P.O. Box 536
Fairfax, Virginia 22030
(703) 250-5900

Center for Renewable Resources
1001 Connecticut Avenue, NW
Washington, D.C. 20036
(202) 466-6350

Consumer Energy Council of America
1900 M Street NW, Suite 620
Washington, D.C. 20036
(202) 659-0404

*U.S. Department of Energy
1333 Broadway
Oakland, CA 94612

Energy Resources Center
333 Market Street
San Francisco, CA 94105
(415) 764-7035 General Information

Conservation & Solar Energy
Forrestal Building
Washington, D.C. 20585
(202) 252-5000

Energy Communication Center
National Council for Resource
Development (AACJC)
One Dupont Circle, NW, Suite 410
Washington, D.C. 20036
(202) 293-7050

Energy Education Program
Academy for Educational Development
680 Fifth Avenue
New York, NY 10019
(212) 397-0040

NATIONAL AGENCIES, cont'd.

*Government Printing Office
Federal Building
450 Golden Gate
San Francisco, CA 94102
(415) 556-6657

*International Solar Energy Society (ISES)
American Technological University
P.O. Box 1416
Killeen, TX 96541
(817) 526-1300

*League for Innovation
1100 Glendon Avenue, Suite 925
Los Angeles, CA 90024
(213) 479-3941

*National Alcohol Fuels Producers Assoc.
P.O. Box 2756
Lincoln, Nebraska 68502
(402) 474-1977
-or-
NAFPA/Washington
1760 Reston Avenue, Suite 102
Reston, Virginia 22090
(703) 471-1611

*National Center for Appropriate Technology
P.O. Box 3838
Butte, Montana 59701
(406) 494-4572

National Center for Resource Recovery
1211 Connecticut Avenue
Washington, D.C. 20036
(202) 223-6154

*National Clearinghouse on Alternative
Energy & Employment Development
2025 San Pedro NE
Albuquerque, NM 87110
(505) 262-1506

National Energy Information Center (NEIC)
Forrestal Building, Room 1F048
1000 Independence Avenue SW
Washington, D.C. 20585
(202) 252-8800

National Gasohol Commission
521 S. 14th Street, Suite 5
Lincoln, Nebraska 68502
(402) 475-8044

*National Solar Heating and Cooling
Information Center
P.O. Box 1607
Rockville, MD 20850
(800) 523-2929

National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161
(703) 487-4600 General Information
(703) 487-4780 Title Information
(703) 487-4650 General Sales

New Mexico Solar Energy Association
P.O. Box 2004
Santa Fe, NM 87501
(505) 983-1006/983-2887

RAIN
2270 N.W. Irving
Portland, OR 97210
(503) 227-5110

Solar Energy Industries Assoc.
1001 Connecticut Avenue, NW
Washington, D.C. 20036
(202) 293-2981

Solar Energy Institute of North America
1110 6th Street NW
Washington, D.C. 20001
(202) 667-6611

*Solar Energy Research Institute
1536 Cole Blvd.
Golden, CO 80401
(303) 231-1000 Public Information
(800) 525-5000 Solar Information
(800) 525-5555 Alcohol Fuels Information

*Technical Information Center
U.S. Department of Energy
P.O. Box 62
Oakridge, TN 37830
(615) 576-1188

Western Sun
Pioneer Park Building
715 SW Morrison
Portland, OR 97204
(503) 221-2437